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# ***JPRS Report***

## **Soviet Union**

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***Economic Affairs***

JPRS-UEA-87-020

30 JULY 1987

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## REVAMPING OF ECONOMIC PLANNING MECHANISM DECREED

## Importance of Restructuring Planning

Moscow PLANOVYE KHOZYAYSTVO in Russian No 5, May 87 pp 3-9

[Report by N. V. Talyzin, candidate member of the CPSU Central Committee Politburo and chairman of the USSR Gosplan, and proceedings of 16 March meeting of the active party membership and administration of the USSR Gosplan, with the agenda "On the course of restructuring and the tasks of the Gosplan party organization and collective in carrying out the decisions of the January 1987 Plenum of the CPSU Central Committee": "Restructuring of National Economic Planning Is the Most Important Factor in Accelerating the Country's Socioeconomic Development"]

[Text] The January 1987 Plenum of the CPSU Central Committee, the speaker said, raised the most important questions of putting the party's strategic policy into effect, displayed a striking example of frank party discussion, and compelled everyone to look at specific work and forthcoming tasks in a new way. The plenum singled out the principal directions for restructuring and provided a comprehensive analysis of its scope.

The report by M. S. Gorbachev, general secretary of the CPSU Central Committee, demonstrated convincingly that restructuring is the basic factor in accelerating the socioeconomic development of Soviet society.

The central economic organs, and the USSR Gosplan first of all, have been called upon to play an important role in its implementation.

In the first place, this role is dictated by the fact that by carrying out a thorough restructuring of the economic system and the entire society, the party is setting the task of further reinforcing and developing the socialist system, guided by an efficient system of centralized planning, in which the USSR Gosplan holds the key positions.

Radical restructuring of the entire system of state planning has become a matter of paramount importance for developing new methods of economic operation, increasing the economic role of the basic unit of the national

economy set forth in the draft of the USSR Law on the State Enterprise (Association), improving the work of all management organs, and expanding the rights and increasing the role of the soviets of people's deputies.

Secondly, many serious problems have been accumulated in planning over the years. To the extent that rates of economic development have slowed down and difficulties have arisen, more and more current and day-to-day problems have been entrusted to the USSR Gosplan. As a result, its main efforts have been concentrated on regulating the processes taking place in the country's economic system with an excessively detailed plan. At the same time, insufficient attention has been devoted to long-term problems, capital investments and material resources have been overextended, and plan imbalance and instability have been permitted. The state plan has lacked scientific substantiation, focus on production intensification, and efficiency.

And thirdly, it is simply impossible to conduct planning work in the old way under current conditions. Fundamentally new approaches are needed in planning.

The national economy is still in the initial stage of restructuring. The most progress has been made in developing the new economic mechanism at the enterprise level, where the basic economic potential is concentrated and material assets are being created.

The principal intention of the reforms is to motivate collectives, basically by economic methods, to take an interest in the results of their labor. The collective's earning of assets for all its needs--technical re-equipment and renovation of production, social development and economic incentive--is taken as the basis. It has been proved in practice that such an approach can provide significant gain.

Labor collectives should operate on the basis of self-support and self-financing and have considerable independence and high responsibility. This will be guaranteed by the USSR Law on the State Enterprise (Association). The democratic principles of the law--direct participation by the collective in shaping the plan and its involvement in all the enterprise's affairs--all this has been aimed at achieving high end results in labor.

So on the one hand, the role of labor collectives in the economic system is increased in the course of restructuring and their economic independence in making economic decisions at their level is expanded within the framework of the state plan; on the other hand, the new economic mechanism cannot function efficiently without increasing the effectiveness of the centralized principle in planned management of the economy and without further reinforcement of state planning activity. For this reason, the problem of combining centralism and democratism requires further improvement in planning.

The entire system of planning is being restructured first of all. The role of long-range plans is being increased and their scientific level is being raised, organic coordination of plans with the long-term objectives and tasks of development is being ensured, and planning is decisively surmounting what

has been brought about. Thorough scientific study of key problems of the long-term future carried out in advance is becoming a crucial lever to ensure reliability and stability in the functioning of the entire economic and social system.

Based on the directives of the 27th CPSU Congress to concentrate attention on the principal long-term problems, work has begun to draft the Conception of the Country's Economic and Social Development for the 13th Five-Year Plan and the Period up to the Year 2005, in which the alternative ways to achieve the objectives approved in the Basic Directions for Economic and Social Development of the USSR will be formulated and their number established, and the basic approaches to resolve major new national economic problems will be stipulated as well. Essentially, work on the 13th Five-Year Plan also is being begun. The role of the five-year plan is being increased even more, its content is being changed, and new levers to increase production efficiency and the indicators to evaluate the results of economic activity are being included.

The structure of indicators approved in the five-year plan will be related primarily to the achievement of end results in work, implementation of the party's new investment and social policy, consolidation of the state's financial position, and increased effectiveness in foreign economic activity. The plan will be guided more and more by scientific and technical progress and economic methods of management. An important step in this direction should be made in work on the plan for 1988, which has already begun.

The new approach to drafting the plan for 1988 calls for further extension of independence and reinforcement of the role of enterprises in drafting the plan. The annual plan will be drafted by enterprises on the basis of long-term economic norms, the five-year plan targets, and the limits of the resources allocated centrally for the year planned, as well as state orders and economic contracts that have been concluded, based on demand for output (work, services).

The task is already being set in drafting the plan for 1988 to ensure that the basic provisions of the draft Law of the USSR on the State Enterprise (Association) are implemented, and to mobilize on this basis all production reserves and resources of enterprises for their adoption independently of indicators which exceed the five-year plan targets for output in demand by consumers.

Considerable attention in drafting the plan is being devoted to increasing the balance of all its indicators and sections. For this purpose, the USSR Gosplan and all the central economic organs at the national stage of preparing the plan draft are conducting a study of the balance and substantiation of the most important economic indicators generalizing development of the economy and are putting together all the necessary source data for thorough drafting of plans by ministries, departments and union republics.

It is being planned to significantly increase the role and responsibility of ministries and associations for ensuring that national economy requirements are provided for in their output. For this purpose, the USSR Gosplan will

work out material balances only for the most important types of output which determine the main proportions, and drafting of plans for distribution of material resources for the remaining output will be transferred to the USSR Gosnab and directly to ministries and major associations.

Under the new conditions, the role of physical balances will increase immeasurably. The 27th CPSU Congress defined the new quality of economic growth as transformation of the growing efficiency of public production and economy into the principal resource for expanded reproduction. This is the basic criterion for shifting the economy to an intensive path of development. The most important targets for economy have been recorded in the Basic Directions for Economic and Social Development of the USSR for 1986-1990 and the Period up to the Year 2000 and in the plan for the 12th Five-Year Plan.

The workability of plans lies in the efficient use of all types of resources and their strict limitation. This also relates to the plan for the 12th Five-Year Plan, which was balanced by taking into account the fulfillment by all sectors of the targets for savings, production intensification, and the introduction of new equipment and advanced technology.

Reinforcement of the influence of the state plan's economic levers on all economic activity is becoming another direction for improving the Gosplan's work. These levers are chiefly long-term economic standards. They are becoming the basic tool for centralized management, a regulator of the enterprise's relationships with the state, an active stimulus motivating the enterprise to draft its plans by taking production capabilities, reserves and resources into account to the maximum extent. The standards ensure stability in the most important proportions stipulated by the plan in distributing profit (incomes) and in establishing incentive funds in conformity with the end results of the work. This new function of the USSR Gosplan will be expanded.

Under these conditions, it is essential for USSR Gosplan employees to become thoroughly proficient in the new planning methods in their sector and to know how to apply them in practical activity.

The Five-Year and Annual Plans Consolidated Department has assumed the basic workload in preparing proposals for restructuring the work. This work should be conducted with the active participation of all consolidated, sectorial and functional departments.

Considerable restructuring of the planning of scientific and technical progress is being carried out, aimed at turning it actually into the supporting structure for plans based on the development of economic levers and incentives for large-scale introduction of scientific and technical achievements in production. Under these conditions, the USSR Gosplan's most important task is to determine the initial data for ministries and departments to draft the plans for generalizing indicators of scientific and technical progress and the economic levers and incentives to accelerate it, as well as to increase the scientific substantiation and quality of state plans based on materials of the overall programs for scientific and technical progress of the USSR and CEMA member countries.

We have to ensure that the role of intersectorial scientific and technical complexes and scientific production associations is reinforced in planning, in selecting the priority directions for scientific and technical progress, and in accelerating the development and broad application of new equipment and highly effective technological processes and new generations of materials. This work should be the focus of attention for all national economic and sectorial complexes.

Taking into account the special role of machine building as the physical base for scientific and technical progress, priority development of its key sectors is being undertaken by means of accelerating the process to update production, increase the technical level of output, and improve the quality of machines and equipment being turned out on this basis.

Enterprises' broader independence in resolving problems in their production and social development and their access to considerable assets of their own require new approaches to planning capital construction and combining overall state interests with the interests of individual enterprises and regions.

Considerable restructuring is necessary in the field of territorial planning. It follows from the familiar decree by the CPSU Central Committee, the Presidium of the USSR Supreme Soviet and the USSR Council of Ministers "On measures to further increase the role and reinforce the responsibility of soviets of people's deputies in accelerating socioeconomic development in light of the 27th CPSU Congress decisions," which includes a number of new provisions. So beginning in 1988, material resources and the limits for capital investments and construction and installation operations for development of a republic's economy in the plan will be allocated to the council of ministers of a union republic as a whole (except for the agroindustrial complex), without apportionment by sectors and objectives. At the same time, only All-Union projects will be included in the state plan. Construction in the republics is being organized in the new way.

Under the new conditions with the broad independence of associations and enterprises, the role of local planning organs and republic gosplans is being increased. It has been established by the decree cited that all enterprises, regardless of subordination, are to coordinate their annual and five-year plans with local organs with respect to development of the social area, construction, and the utilization of manpower resources, local types of raw material and materials, and other fundamental matters which affect the territorial plan.

It is necessary to translate these new approaches of planning "from below" into specific methods and organizational forms of territorial planning at the level of the USSR Gosplan and the gosplans of union republics.

Resolving the problems of increasing the effectiveness of foreign economic ties and developing and intensifying socialist economic integration in the new way raises the questions of improving this work in the USSR Gosplan. For this purpose, it is necessary to look for forms of planning foreign economic ties at the USSR Gosplan level which provide for efficient combination of the

rights granted to ministries and enterprises in conducting foreign economic activity with overall state interests. Elements of foreign economic activity of most importance, such as the country's payments and currency balances, will remain the subject of centralized planning management as before.

It was stressed at the January (1987) Plenum of the CPSU Central Committee that restructuring means priority development of the social area and more and more completely meeting the Soviet people's requirements. However, until now the priority solution of social problems has not yet become characteristic in the work style of the entire collective of the USSR Gosplan. Departments directly engaged in planning social development have not taken active stands pursuant to the decisions of the CPSU Central Committee Plenum.

Changes in the organizational structure of the USSR Gosplan determine and predetermine the most important directions in restructuring planning work. The restructuring should ensure the complete interaction and unity of the USSR Gosplan's work with permanent organs of the USSR Council of Ministers and central economic departments and ministries. It is based on the principle of reinforcing an overall approach in the management of groups of interrelated and similar sectors. This requires the appropriate organization of work by the USSR Gosplan--planning in accordance with the major intersectorial complexes.

The sectorial principle in managing the national economy is being maintained. The point is to really take overall state interests into consideration first of all in order to overcome narrow sectorial and departmental tendencies which still exist, including in the USSR Gosplan. For this purpose, an organizational consolidation of functional and sectorial principles is necessary in planning work, which means a shift to a functional-sectorial principle in planning organization which will make it possible to eliminate the narrow sectorial nature of departments' activity and provide a real opportunity to conduct planning of all functions in a complex: consolidated work and planning of production, new equipment, scientific achievements, materials support, savings, and new methods of economic operation for all sectors in the complex.

The restructuring being carried out in the country and its success depend to a crucial extent on personnel. As M. S. Gorbachev pointed out in his report at the January plenum, the attitude of personnel toward restructuring and the tasks of accelerating the country's socioeconomic development, not in words but deeds, is the crucial criterion in personnel policy today. The main demands being made of the USSR Gosplan employee are: a thorough understanding of Marxist-Leninist theory, a high level of professional knowledge and moral qualities, adherence to party principles, the skill to approach solution of any problem from state positions, the ability to withstand bureaucratic and localistic tendencies, and observance of party and state discipline.

The January CPSU Central Committee Plenum set the task of extending openness and taking into account collectives' opinion in selecting and advancing personnel. This applies completely to the USSR Gosplan collective as well. It is necessary for everyone to be restructured, to learn how to work in the new way, and to realize and comprehend the extent of the changes taking place.

Those taking part in discussing the report included A. G. Shkurskiy, deputy chief of the Material Balances and Distribution Plans Department and deputy chairman of the USSR Gosplan party organization for monitoring activity to improve economic planning work; V. V. Metnev, chief of a subsection of the Capital Investments Consolidated Department and department party bureau secretary; L. B. Vid, deputy chairman of the USSR Gosplan; O. A. Lomanov, deputy chief of a subsection of the Transport Department and deputy secretary of the department party bureau; D. G. Khodzhayev, deputy chief of the Housing and Municipal Services Department and lecturer of the USSR Gosplan party committee; I. I. Chuverin, secretary of the USSR Gosplan party committee; N. K. Pravednikov, director of the All-Union Scientific Research Institute of Complex Fuel and Power Engineering Problems; V. N. Fridlyanov, deputy chief of a subsection of the Science and Technology Department and secretary of the department party bureau; S. G. Guchmazov, department chief and member of the bureau of the USSR Gosplan party committee; V. B. Bezrukov, chief of the GVTs [Main Computer Center] of the USSR Gosplan; and A. L. Mukoyed, member of the USSR Gosplan Collegium and department chief.

Unanimous support for the decisions of the January (1987) Plenum of the CPSU Central Committee was expressed in addresses by the USSR Gosplan communists. It was noted that the USSR Gosplan collective had begun restructuring the forms and methods of drafting state plans aimed at resolving the problems of accelerating the country's socioeconomic development, broadening enterprises' economic independence, and improving the organizational structures of management. Substantial changes have been included in the plan for 1987, its structure and the system of approved indicators. New sections have been created in the annual plan for major intersectorial national economic complexes. A comprehensive social section has been developed for the first time. The composition of approved indicators for all sectors is being brought into conformity with requirements of the new economic mechanism. It was emphasized that further important changes are being introduced in the draft plan for 1988, which should become a detailed program of practical actions to implement the strategy developed by the party for reforms in the economic system and the social area.

Proposals for improving the activity and increasing the role of the USSR Gosplan have been prepared and submitted to management organs. The basic provisions of this plan are being implemented in practice in organizing work with broad involvement of scientific forces in the Conception of Economic and Social Development in the USSR up to the Year 2005.

Under these conditions, it was stated in the speeches, the work of the USSR Gosplan's party organization has become more purposeful. Excessive organization and paper-shuffling are being surmounted consistently. As a rule, important matters related to restructuring the work of the USSR Gosplan are being submitted at party committee sessions and party meetings. Collective leadership is being reinforced in developing and adopting party decisions and monitoring their implementation. Exactingness toward communists for the work

entrusted to them has been increased. A more objective interaction with party committees of ministries and departments of the USSR, enterprises, and party bureaus of institutes attached to the USSR Gosplan has become a new feature of the style and methods of the party committee's work.

At the same time, the speakers stressed, only the first steps have been taken in the important task of restructuring all the activity of the USSR Gosplan. Stereotypes and inertia in thinking and obsolete approaches in adopting plan solutions still have not been overcome. Personnel work is not being improved sufficiently in light of the directions of the January (1987) Plenum of the CPSU Central Committee. Certain specialists have insufficient initiative and creativity, and proper adherence to principle in criticism and self-criticism does not exist yet.

Work to develop democratization in planning, taking into account the provisions of the draft Law of the USSR on the State Enterprise (Association), is proceeding poorly. New opportunities for further developing the economic mechanism on the basis of full cost accounting, self-financing, and emphasis on quality and scientific and technical progress still have not become the foundation for planning work by departments of the USSR Gosplan.

The task of developing and practically applying the principles of democratic centralism set forth by the January (1987) Plenum of the CPSU Central Committee requires prompt reinforcement of initiative and creative activity in conformity with the need to turn the plan into the main tool for carrying out the party's economic strategy.

Restructuring work is being impeded to a considerable extent by the fact that the planning administrations of similar sectors still have not become effective links in organizing overall planning, establishing priorities in scientific and technical progress, and in seeking more efficient solutions.

It was noted at the party meeting that success in restructuring the economic system depends to a large extent on the efficient activity and persistence of every communist and all specialists of the USSR Gosplan in turning it into the country's true scientific and economic headquarters, in concentrating on long-range planning problems, providing for proportionate and balanced development of the economy, carrying out an active structuring policy, and establishing the conditions to achieve the highest end results in every cell of the national economy. Only on this basis is it possible to increase the role and authority of the USSR Gosplan.

In the resolution approved, the party aktiv meeting requested that communists of the USSR Gosplan concentrate efforts on implementation of the provisions of the 27th CPSU Congress and the January (1987) Plenum of the CPSU Central Committee with respect to increasing the efficiency of centralized management of the economy, reinforcing democratic principles in management, reorganizing productive forces on the basis of accelerated scientific and technical progress, and improving production relationships and the entire system of socialist economic operation.

It was determined that the most important tasks for communists of the USSR Gosplan are: implementation of the party's economic strategy in working out problems for the long term, as well as in the draft of the state plan for 1988; reinforcement of the social orientation of plans; and improvement in the methods and organization of drafting state plans as applied to the new conditions of economic operation and changes in the organizational structure of management, the increased role of soviets of people's deputies, and the transition of enterprises and associations to full cost accounting and self-financing. Work to further improve the selection, placement and training of personnel in strict conformity with Leninist principles and requirements of the party's 27th congress and the January (1987) Plenum of the CPSU Central Committee was acknowledged to be essential.

It was recommended that management and party and trade union committees organize discussion of the urgent problems of restructuring planning and organizational structures in departments and subunits with the aim of identifying new suggestions and approaches to resolve the problems of improving the activity of the USSR Gosplan.

The meeting of the USSR Gosplan party aktiv called upon communists and all specialists to make a worthy contribution to restructuring planning activity in order to accelerate the country's socioeconomic development and put the decisions of the 27th CPSU Congress and the January (1987) Plenum of the CPSU Central Committee into effect.

#### Problems in Improving Planning

Moscow PLANOVYE KHOZYAYSTVO in Russian No 5, May 87 pp 47-50

[Article by E. Figurnov, doctor of economic sciences: "Urgent Problems in Improving Planning"; passages in all capital letters printed in boldface in source]

[Text] The draft of the Law of the USSR on the State Enterprise (Association) points out that "the activity of an enterprise is established ON THE BASIS OF THE STATE PLAN for economic and social development as the most important instrument for implementing the economic policy of the Communist Party and the Soviet state." (1) Consequently, the activity of enterprises in conformity with the principles of full cost accounting, self-financing, economic competition and socialist self-management by no means implies a lessening of the importance of development according to plan in the economic system.

At the same time, the draft of the law calls for a considerable increase in the scientific level of planning and a change in its technology. These changes should eradicate the planning shortcomings which the party pointed out at the January (1987) Plenum of the CPSU Central Committee: the subjectivism, imbalance and instability of plans and the attempt to cover everything in the plan, right down to the petty details. At the same time, planning technology should become MORE DEMOCRATIC, develop labor collectives' initiative to the full extent, and be guided by their socialist enterprise and better knowledge of their own operating conditions rather than by any higher levels of management.

In contrast to procedure in effect in the past, the draft provides for participation by labor collectives in drafting plans RIGHT AFTER PREPARATION by planning organs of the draft of the BASIC DIRECTIONS OF ECONOMIC AND SOCIAL DEVELOPMENT OF THE USSR for the forthcoming five-year plan and the long-term future. Based on the indicators established by this draft, the enterprise "works out proposals in accordance with its own development." These proposals should stipulate measures to expand production and increase its technical level, update and improve the quality of output in conformity with the domestic and world markets, more fully utilize scientific and technical achievements, and take an active part in various kinds of programs. In drafting these proposals, as well as all types of plans, the enterprise "proceeds from the necessity of meeting increasing requirements and consumer demand for high-quality output (work, services) with the minimum expenditures and by providing for an increase in the collective's income through cost accounting."

Obviously, in order to prepare well-founded proposals in accordance with its development which are aimed at minimizing expenditures and increasing cost-accounting income, an enterprise should have not only a projection of scientific and technical progress and the demand for output, but proposed price changes, and future economic norms for apportioning profit or income for the part entered in the budget and for a higher organization and for the part going into the collective's cost-accounting income.

Consequently, the balances not only of the basic material and labor resources, but the financial resources as well, should be worked out as early as in the stage of preparing the draft of the Basic Directions for Economic and Social Development of the USSR by the USSR Gosplan together with other central economic organs. At the same time, the financial resources should be worked out not in comparable prices, but in prices for the planned period, which anticipate the changes for groups of commodities and sectors, if not the presence of the entire system of prices for the future five-year plan. At this stage, those economic norms for sectors which they will have to be guided by should be determined on the basis of the financial balances.

It is important to stress that under the conditions of economic operation established by the draft of the law, precisely long-term economic norms become the basis for economic methods of managing the activity of enterprises and putting together all types of plans: proposals worked out before organizing the five-year plan and five-year and annual plans. This condition has not yet been realized in planning practice.

So the enterprises' transition to the principles of full cost accounting at the beginning of 1987 was made when the five-year plan had already been put together and approved. Long-term economic norms, consequently, could not become the basis for drafting the five-year plan of an enterprise and demonstrate their effectiveness in this stage. Moreover, they became derivative from the five-year plan, that is, they were calculated on the basis of absolute indicators of the enterprise plans that had already been approved. For this reason, they are differentiated by enterprises and by years of the five-year plan for the same enterprise, as a rule. As a result, the norms of

interrelations with the budget and a higher organization are not performing their basic function--to provide for the uniform requirements of the state for enterprises' utilization of the same quantity and quality of material, labor, financial and natural resources. Their only remaining advantage over the absolute indicators of payments or funds is that they represent the proportions for allocating the earnings, income or profit known in advance to the collective and consequently provide incentive to increase and improve output, as well as to economize resources.

Because the scientifically substantiated theory of differentiating long-term economic standards is not used in planning, the current five-year plan, though in a different form than before, is continuing "the unsuitable practice of redistributing incomes when the financial losses of lagging enterprises, ministries and regions are covered up by those operating at a profit. This impairs cost accounting and gives rise to parasitism..." (2)

The draft law contains a requirement aimed at changing the existing practice: "The norms for apportioning profit (income) between an enterprise and the state budget should provide for the state's requirements that production and labor resources be utilized by enterprises equally." In order to implement such a provision, it is necessary first of all to put the draft's directions into effect in planning and economic operation to the full extent: "The enterprise makes payment to the budget for the resources at its disposal."

The PAYMENTS FOR RESOURCES perform three functions: they form the budget revenue; they immobilize part of the income acquired by the enterprise owing to the availability of better material, labor and natural resources and equalize on this basis the objective startup conditions, not dependent on the collective, to create the income left after deducting the physical inputs and payments for resources and interest; and they provide incentive to economize resources.

Payment for material resources is made in the form of CHARGES FOR PRODUCTION CAPITAL. The norm for the charge may be established for each ruble of all production capital or each ruble of the production capital which exceeds a certain minimum level in the capital-labor ratio. If two enterprises are turning out the same products but the first one is equipped with more efficient capital with higher value than the second enterprise, it will make a higher payment to the budget than the second one. But in normal economic operations the first enterprise will acquire more income with the aid of more efficient capital. Thus the charge ensures immobilization of additional income (profit) acquired with better production capital. If two enterprises have the same production capital but the first one makes use of it on two shifts and the second one uses it on one shift, producing less output, the total charge per unit of output for the first enterprise will be half that of the second one and the income (profit) remaining will be greater. In general, the less production capital, the less the charge for it, and the greater the income (profit) of an enterprise and all its integral parts, including the collective's cost-accounting income, other things being equal. The charge for capital is not being applied in all sectors at present. This shortcoming in the current economic mechanism must be eliminated in the coming years.

It is well known that the more productive land and the richer mineral deposits lead to differential rent--in addition to the income of the enterprises exploiting them, compared with less favorable or average natural conditions. In order to establish uniform conditions for acquiring cost-accounting income, the differential rent should be immobilized. Its immobilization provides incentive to make better use of natural resources at the same time, since the less the charge, the less the resources and the more efficient the production.

With prices which are in conformity with publicly necessary expenditures and a theoretically valid system of standards for payments for resources and interest rates for loans, the income of an enterprise left after their immobilization will include only that part of the overall income which depends on the collective's own efforts during the period under review. The remaining income (profit) under these conditions should be apportioned, as a rule, in accordance with identical standards for all enterprises in the sector and include the following parts: the part transferred to the budget; the part given to a higher organization; and the basic part--the cost-accounting income of the collective, at the enterprise's disposal and not subject to immobilization.

The long-term economic standards enumerated, which are known to them beforehand, will encourage enterprises' accounting of available reserves to the maximum extent in the course of working out proposals for their development and drafting their five-year plan. It should be stressed that under conditions in which the stability of the standards cited is ensured, any kind of hidden potential will lead only to complication of the enterprise's activity and will turn out to be unprofitable for it.

Sound proposals by enterprises for their development enable planning organs to adjust the projection of material balances, the balances of production capacities, and the volumes and allocation of centralized capital investments stipulated in drafting the country's Basic Directions for Economic and Social Development, and to provide for greater accuracy in projections of production balances and consumption in the entire national economy on this basis. Two decisions may be made as the result of refinements for a specific enterprise.

First. The projections of an enterprise on the volumes and development of production for the future five-year plan as a whole are approved and refined for it as CONTROL FIGURES for the five-year plan, which serve as the basis for concluding economic contracts with the consumers of output and the suppliers of material resources and for drafting plans to develop production capacities and conclude the economic agreements necessary for this purpose. Proportionality in production and consumption in accordance with the individual standard grades and sizes of the output (types of work or services) produced by a given enterprise will be ensured in the process of concluding these economic agreements.

Second. An enterprise's projections for production volumes or production development for the future five-year plan are only partially approved if they exceed the requirements of the country and for export which were identified in working out the material balances (capacity balances), or if they do not

provide for the production of output (performance of work, services) necessary to implement overall state or sectorial economic or scientific and technical programs and to achieve balance in development of the national economy. If the enterprise is capable of producing this needed output not stipulated in its projections, state organs issue AN ORDER for its production. Where necessary, the order indicates the consumer of the output being ordered and other conditions required to carry out the order (prices or other economic norms, and so forth) are provided. State orders are accepted by the enterprise for fulfillment obligatorily.

So in the first case the enterprise's proposals are taken as the targets for production, but in the second case, the adjusted projections of the enterprise are used. Obviously, with such planning organization the overwhelming part of production volume will be established in accordance with the enterprise's proposals. In fact, the proposals for an open-pit coal mine, a metallurgical combine, a sewing mill or the like, as a rule, will be included as a whole in the national economic plan, inasmuch as the country needs coal, and metal, and sewn items. The only situation which may arise is when the proposals of all producer enterprises exceed the actual future demand for some specific product or another. In this case, the task of state organs is to review the production program of part of the enterprises and to give them state orders for the output in demand and which they are able to produce.

Such organization ensures broad democratization in the process of putting together a production plan and developing an enterprise's capacities, and at the same time, it provides for the necessary state adjustment of production and consumption, their balancing in accordance with the most important product mix achieved with the aid of material balances, and their balancing in accordance with a detailed products list based on economic agreements between producers and consumers. The production growth taken into account in material balances in accordance with the proposals of operating enterprises will predetermine the capital construction program for these enterprises through their own resources and bank loans.

When the capacities calculated by taking into account their growth at operating enterprises are inadequate to cover the demand established by the material balance, state organs make the decisions to build new enterprises or expand the ones in operation at the cost of centralized investments. Targets for introducing such capacities are one of the versions of a state order to an enterprise.

In a balanced economy without shortages, the establishment for enterprises of control figures for production and state orders does not require additional approval for enterprises of the limits of resources being consumed, since the demand corresponds to the production (the material balance has been reduced without a shortage). An agreement may be concluded between the consumer and the producer in accordance with the consumer's demand. There is no necessity of approving a limit (capital) for the consumer in use of a material resource, and what is more, approval of capital in this case leads to worse use of the material resource.

In fact, the higher organ for an enterprise may establish the funds and targets for consumption of a material resource only with certain precision, and errors are likely both on the side of a decrease as well as an increase. If the indicators for input and consumption of materials were set higher than the volumes and the norms necessary for the enterprise under conditions economical for their consumption, it will withdraw resources in stocks from circulation, give up part of the capital allocated, or it will be forced to seek a purchaser for unneeded items of value. If the funds and indicators for consumption of a material resource have been established so that an association (enterprise) will not be able to "keep within" them, this will lead to nonfulfilment of the targets for output and a decrease in production efficiency. Both these possibilities reduce the efficiency of public production.

It is different when the material balance has been combined with a shortage: restrictions on the product's consumption and approval of a limit (capital) for its distribution for the enterprise are unavoidable. However, in this case there is no need to approve targets for the enterprise for its consumption (consumption norms, targets for their reduction, and so forth). After all, the enterprise cannot acquire resources above the allocated limit. Under the conditions of full cost accounting, it is concerned with economizing them and therefore tries to produce as much as possible with the limit allocated.

Decreasing a shortage, consequently, reduces the field for funding material resources and expands the area for their wholesale trade. For this reason, it was established in the draft Law of the USSR on the State Enterprise (Association) that "WHOLESALE TRADE SHOULD BE EXPANDED AND BECOME THE BASIC FORM of material and technical support to the extent that production is expanded and demand is met for output of a technical-production nature, as well as to the extent that the effect of full cost accounting and self-financing is reinforced in reducing material production costs."

Consequently, with full cost accounting and self-financing, an enterprise's five-year plan becomes the basic form of planning and organizing its activity. It is put together by the enterprise independently on the basis of long-term economic norms and control figures for production volumes determined in conformity with enterprises' proposals, taking into account state orders for the production of types of output (performance of work, services) which were not called for in the enterprises' proposals but which are needed for society (including for the introduction of capacities with centralized resources), as well as the limits of resources in short supply allocated centrally. The draft of the plan is coordinated with territorial organs in accordance with the indicators established.

Under conditions when the five-year plan becomes the basic one, the ANNUAL plan is drafted by the enterprise on the basis of it, approved economic norms, state orders, economic agreements which have been concluded, and the demand for output, work and services.

Changes in the draft of the annual plan worked out by the enterprise may be submitted by higher organs only in the state orders part. This will substantially increase the continuity and stability of economic relations in the country, which until now have been changing every year.

FOOTNOTES

1. PRAVDA, 8 Feb 87.
2. "Materialy XXVII sъezda CPSU" [Materials on the 27th CPSU Congress], Moscow, Politizdat, 1986, p 34.

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## ECONOMIST EXPLORES APPROACHES TO PLAN OPTIMIZATION

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[Article by B. Smekhov, doctor of economic sciences: "Problems in Optimization of Long-Range Plans"; first paragraph is introduction; passages in all capital letters are printed in boldface]

[Text] The current five-year plan is laying the foundation for implementation of the party's strategic policy to accelerate the country's socioeconomic development in the period up to the year 2000. How is this foundation to be utilized most effectively in plans for the 13th and 14th Five-Year Plans? We have to think about this now. A comprehensive restructuring of the methods and technology of long-range planning is needed. This presupposes first of all that methods for the overall optimization of long-range plans are mastered with the aid of computer hardware.

The problems of optimum national economic planning became the subject of numerous discussions as long as a quarter century ago. However, they died down little by little, and recently they ceased completely. What is the reason? Is it possible that universally accepted solutions have been found? Then why aren't they mastered in practice? Is there really no necessity of optimizing plans?

The CPSU Program adopted at the party's 27th congress emphasizes that the new advances to be made by Soviet society based on acceleration of socioeconomic development presupposes, in particular, that the OPTIMUM STRUCTURE and balance is provided for in the country's unified national economic complex.

Under the conditions of intensification of public production on the basis of scientific and technical progress, the number of alternative long-range plans is increasing sharply. Meanwhile, the planning technology which has taken shape makes it possible to examine an insignificant part of them, and for this reason restructuring of national economic planning, and the methods of optimizing long-range plans first of all, is necessary.

Why are we singling out optimization of long-range plans? The limits of an annual period are too narrow for this. True, in that part of current plans which relates to reconstruction of enterprises begun in the year planned, new construction, geological exploration, and personnel training, there is a great

deal of space for planning decision variations. But the most effective one can only be selected by comparing their socioeconomic consequences, since the final results from newly begun renovation and new construction operations will not be achieved in a given year, but in future years. Hence the main role of long-range plans is to substantiate what should be begun today for the future.

Upon very close examination it turns out that even a 5-year outlook is insufficient for such substantiation. Construction begun in a given year, especially major construction, and the results of planning and surveying and geological exploration operations yield a gain beyond the limits of 5 years. This attaches vast importance to THE COORDINATION NOT ONLY OF ANNUAL PLANS, BUT FIVE-YEAR PLANS AS WELL, WITH LONG-TERM ONES.

Although only the basic directions of socioeconomic development are approved for a period in excess of 5 years, long-term planning calculations should contain grounds for those targets of five-year and annual plans which are directed to the future.

The principle of comprehensiveness in planning requires national economic intersectorial and interregional planning calculations for selection of the most effective solutions of a long-range nature. Determination of the possible technological solutions is primarily the work of associations (enterprises) of sectorial management organs. However, changes in the technological structure of production in a given sector affects other sectors and the national economy as a whole, which should be reflected in long-term plans.

On the other hand, comprehensiveness in national economic planning does not allow digression from the specific opportunities for technical development of each sector and assumes an organic interrelationship of the overall and the specific. Long-range planning is capable of performing its function of substantiating current plans with future national economic requirements only when there is unity of analysis and synthesis.

The requirement to aim for an optimum correlation between consumption and accumulation was set forth in the CPSU Program among the tasks related to major changes in the structure of the economic system. This requirement can be implemented only by means of COMPREHENSIVE OPTIMIZATION of the entire system of centrally planned targets. No global macromodels or models with a limited product mix (including the 18-sector one being used in practice) are capable of substantiating the optimum correlation between consumption and accumulation. The dependence of the optimality of this proportion on the structure of changes within the consumption and accumulation funds is too great. Under present conditions, this dependence is increased over and over again, since the essence of acceleration does not come down to an increase in the growth rates; it includes QUALITATIVE changes in public production based on acceleration of scientific and technical progress.

For optimization of long-range plans, it is necessary to develop their alternative versions and clearly express the criterion for optimality. Common, invariable elements may be singled out in all versions of a long-range national economic plan.

Firstly, in approaching the draft of a long-range national economic plan, they are based on the availability of material resources by the beginning of the plan period and the prospective dynamics of manpower resources. There is no place for variation here. Accuracy is needed in the data and in their evaluation. Secondly, there are a number of plan targets which are determined AUTONOMOUSLY which are identical in any version. The resources involved are those:

--which ensure that NATIONAL needs (defense, foreign economic, ecological, administrative) are met;

--which are required for development of the material and technical base of the PRODUCTION INFRASTRUCTURE--construction of railroads, highways, canals, reservoirs, ports, bridges, warehouses, telegraph and telephone lines and the like. The plan versions must be developed by focusing on the overall work conditions in the basic sectors of physical production. Opportunities for autonomous establishment of a plan for the material and technical base of the production infrastructure are provided for by preplan drafts of the Comprehensive Program of Scientific and Technical Progress for 20 years and the allocation of productive forces;

--which meet the requirement for development of science in the period planned; and

--which are necessary for increasing and developing new MATERIAL RESOURCES for the purpose of localizing natural disasters, as well as partial disproportions, cases of plan nonfulfillment, and so forth.

In addition, at least a specific standard, if not the absolute magnitude, for the ratio of the increase in construction starts at the end of the period compared with the beginning to the overall volume of capital investments for the entire period has to be stipulated for all versions of the plan. The point is that this work in progress cannot influence the meeting of requirements within the limits of the plan period and there is no sense in its variation for this reason. Analysis shows that the magnitude of increase in construction starts in calculations for 15 years amounts to no more than 1 to 2 percent in relation to the capital investments over this time. Consequently, a standard can be established approximately.

The development of all public production, both in volume and composition, is subject to variation with the deduction of the elements enumerated, and the longer the period being planned, the more the alternative versions.

Variations of a balanced long-range national economic plan have differences in the growth rates of sectors, subsectors and regions which depend on the amount and distribution of capital investments. At the same time, the characteristics of the sectorial and territorial structure of capital investments in various drafts of a balanced plan are determined by differences in the technical and technological development of the national economy and the

structure of nonproduction consumption. Thus, variations of the rates and proportions of long-range development of the national economy reveal objective dependence on scientific and technical progress and the ultimate requirements of society for improving the people's welfare.

In order to achieve balance in each plan variation it is important to distinguish the elements of technical progress and people's welfare determined quantitatively which make it possible to link diverse material balances without going beyond the limits of the objectively known dynamics of manpower resources and by providing for full employment of the able-bodied population. Such elements, FROM THE ASPECT OF SCIENTIFIC AND TECHNICAL PROGRESS, are variations in the planned norms for the capital-output ratio and the energy-, materials- and labor-intensiveness of production and services. For brevity let us call them the FEMT. FROM THE ASPECT OF PUBLIC CONSUMPTION, these elements appear as per capita norms for the consumption and use of different material wealth--objects of consumption, services and nonproductive fixed capital.

The balanced method of national economic planning always has been based on the development of variations in technological and consumption norms. However, the current practice in applying it is such that a considerable number of variations in a balanced plan continue to remain without examination and analysis. The point is that the technological structure of production for each type of centrally planned output (1) is determined without regard to the technological structures of production for other types of output. Moreover, the objective dependence of changes in the structure of public consumption of output on the level of development of productive forces is not established in a quantitatively specific form.

How is the technological structure in electric power production formed, for example? After receiving the limit of capital investments and calculating the requirements for reconstruction and technical re-equipment of operating enterprises, the sectorial ministry apportions them between reconstruction and the new construction of thermal electric, hydroelectric, and nuclear electric power plants as dictated by sectorial technical and economic calculations. No matter how refined these calculations are, they cannot resolve the problem at the sector level of which variation in the allocation of capital investments among the different types of power plants will provide for the greatest and best end result for development of the national economy--the maximum possible rate and the quality of public welfare--in a given long-term period.

Let us assume that the sector specified the variation for changing the relative share of electric power produced by the TES, GES and AES which will reduce the production cost of 1 kilowatt-hour of electric power to the maximum extent. However, this will require that the power plants planned for reconstruction and new construction be supplied with specific equipment and construction materials, that the capacities of construction organizations be provided for, and so forth. Where are the guarantees that in other decisions

on the technological structure for development of electric power production, and consequently other requirements for equipment, materials and so forth, a smaller reduction in the production cost of electric power cannot be exceeded by a considerable gain in economizing national labor in other sectors? The sector cannot provide such guarantees.

Perhaps the USSR Gosplan is capable of providing these guarantees after adjustment of the plan draft presented by the ministry? A negative reply follows if only because in the best case the adjustment itself pursues the objective of balancing other specific drafts of plans for other sectors which have been isolated just as much. For this reason, it is not the point at all where the plan is put together, in a sectorial or an intersectorial organ. The main point is the separate planning by individual sectors and their technological structures. The subsequent joining of the structure results only in certain adjustments for balancing within the sectorial limits of capital investments already established beforehand.

But determination of the limits of capital investments themselves for sectors and regions also precedes planning of the technological structure of production, although they are objectively interrelated. Meanwhile, the limits of capital investments for sectors and regions are being established without regard to the technological solutions, which are still unknown at this point, and the technological solutions are approved within the limits of the capital investments and are unable to influence them. As a result, only those variations of a balanced long-range plan are compared which are differentiated only by the necessary amendments. More precisely, there is simply no comparison of variations. The variation put together on the basis of the plan drafts of sectors and republics within the limits of capital investments given in advance is subjected to individual refinements and improvements from the viewpoint of society's requirements, without substantial review of the initial limits of capital investments and the technological solutions scheduled. But precisely such fundamental examination is necessary for an expansion of the group of plan variations compared.

The main shortcoming in the planning technology in effect is violation of the principle of comprehensiveness: certain planning decisions are made on the basis of other ones, although both those and others are interdependent.

Under conditions of primarily intensive reproduction, the demand for a shift to the technology of comprehensive multiple-variation planning of the entire system of material and labor proportions has sharply increased. Modern computers establish the physical basis for this and provide the opportunity to find the national economic optimum out of all the variations of a long-range plan which are practically possible.

In the optimization of long-range plans, we have to proceed from the fact that the overwhelming bulk of capital accumulation, and capital investments first of all, produced over 15 to 20 years affects the growth rates of public welfare within the limits of this period. For this reason, the accumulation variations may be compared directly in accordance with the criterion of the fundamental purpose of socialist reproduction. The task consists of expressing the entire system of material and labor balance variations, using

the intensive technology of planning with the aid of a computer, in the form of a unified system of equations and disparities which lends itself to solution by calculating for the maximum value of the target function of the people's welfare. With all its complexity, this task is fully capable of solution. First of all, it is important to restrict it to the MATERIAL AND LABOR content of the plan. The material and labor proportions of development are organically linked with the cost and monetary-financial proportions in the process of implementing the plan. Underestimation of commodity-money relationships cannot be tolerated. In conformity with the decisions of the 27th CPSU Congress, economic norms are playing a more and more important role in the economic mechanism, sharply reducing the number of directed plan targets and broadening the independence of enterprises. In setting the task of determining the national economic optimum, why is it considered possible to initially restrict plan variations only to the material and labor proportions?

This restriction is not only possible but necessary when it does not entail implementation of the long-range plan, but its drafting. Any CHANGES PLANNED IN THE SYSTEM OF PRICES, RATES AND NORMS FOR WAGES AND LABOR INCENTIVES, INCOMES AND EXPENDITURES CANNOT BE SUBSTANTIATED IF THE MATERIAL AND LABOR PROPORTIONS AND THEIR STANDARDIZED BASIS--THE FEMT NORMS--ARE NOT KNOWN; the FEMT norms were mentioned previously. We are striving to ensure, in particular, that prices are not separated from their value basis--publicly necessary expenditures. The latter depend on the FEMT variations being planned and the technological structure of production.

Thus, IN LONG-RANGE PLANNING IT IS NECESSARY INITIALLY TO DETERMINE THE MATERIAL AND PHYSICAL ELEMENTS OF THE PLAN, AND THEN THE COST AND MONETARY-FINANCIAL ELEMENTS ON THEIR BASIS. Such a sequence in calculations is dictated by the intrinsic logic of planning and is not a new requirement brought about by the optimization of plans. It has been used in long-range planning since the plan for the GOELRO [State Commission for the Electrification of Russia].

What are the bases for practical solution of the task set above? Any material balance in the process of planning is an equation in which the unknown quantities are all elements except the stocks at the beginning of the year and certain national requirements established beforehand. The technological structures of production projected at the sectorial level predetermine the weighted average norms for the input and use of capital goods, which make it possible to solve the system of balance equations by the iterative method. However, as emphasized, the technological structures of production should be determined on an intersectorial basis. This means that in each balance equation the unknowns should not be common production volumes for a given product and the articles on which it is used, but differentiated by technologies. In this case, VARIATIONS IN THE RATES OF CONSUMPTION DIFFERENTIATED BY TECHNOLOGIES, which are actually the original ones, not weighted average variations, will figure in the balances of capital goods.

The apparent complexity of such a system reflects the complexity of the task which objectively exists, which has to be resolved in practice by the imperfect iterative method, leaving outside the field of view a considerable

number of possible variations in the solutions. Computer hardware makes it possible to rapidly and accurately determine the optimum values for all unknown variables, differentiated by production technologies. At the same time, the system of equations should include both the material and the labor balances, of course. In the labor balance equation, the norms of labor-intensiveness are also differentiated by the technological variations. Moreover, the system of equations has to be supplemented by a number of land and other natural resource limitations, as well as requirements of a social nature.

It is necessary to express the ultimate objective of long-range plan optimization in a form in which a specific level of national welfare, depending on the set of per capita norms for the consumption and utilization of material wealth and services, corresponds to each variation for solution in the system of material and labor relationships. This refers to the target function of optimum planning.

The basic principles in optimizing calculations come down to the following.

Firstly, in equations relating to the production of an investment complex (machine building and construction), variations in the norms of utilization, essentially the VARIATIONS IN THE CAPITAL-OUTPUT RATIO (by types of capital), should be employed INSTEAD OF VARIATIONS IN RATES OF CONSUMPTION.

Secondly, an equation of the manpower resources differs in that their overall value is not an unknown; it is fixed for each year of the long-range period. The distribution of these resources is the unknown quantity. The sum of the norms of labor-intensiveness, differentiated by technologies, multiplied by the corresponding unknown production volumes and manpower resources in nonproductive sectors is equal to the overall value of manpower resources. The requirement for FULL EMPLOYMENT of the able-bodied population in the social economic system is expressed in this.

Thirdly, the limitations of natural resources and a number of social factors take the form of inequalities, as a rule; namely, they predetermine a plan optimum in which production of each type of output is apportioned among the various technologies, and is not concentrated at one type of enterprise.

The problem of the TARGET FUNCTION of optimum planning must be examined in more detail, since this matter has given rise to the most divergence of opinion in theoretical discussions on plan optimization.

Let us note first of all that THE LEVEL OF THE PEOPLE'S WELFARE IS THE TARGET FUNCTION OF THE PLAN FOR THE LONG TERM. And in our view, MAXIMIZATION OF THE LEVEL OF THE PEOPLE'S WELFARE CANNOT BE LINKED WITH AN INCREASE IN SOME VALUE INDICATOR (the people's welfare fund, let us say). The value indicator does not reflect the necessary structural changes. It is impossible to establish them beforehand, since they depend on the unknown level of development of productive forces.

All this has been sufficiently substantiated and is commonly recognized in scientific research on problems of planning optimization. But what shall we do with the establishment of a target function if the level of people's welfare being maximized must be expressed in one number, whereas the people's welfare is made up of a combination of elements of different qualities known not to have common units of measurement? This matter has also resulted in the most differences of opinion on approaches to resolving the problem of optimizing development of the national economy. Some believe that universal interchangeability of the elements of public welfare should be recognized and coefficients sought for their usefulness so that the target function is expressed in the maximum "integrated usefulness." Others reject such an approach as contradictory to the objective fact of the incomparability of the components of public welfare.

The combination of per capita norms for the consumption and use of material wealth and services is subjected to structural changes to the extent that economic opportunities are increased. Some norms are increased, but certain ones are completely reduced as well. Practically significant changes in them are such that there can be no discussion of any interchangeability.

Interchangeability is universal in nature in the area of capital goods consumption, since the substitution of certain consumption values by others very far apart in function may appear economically advantageous in the chain of intersectorial ties. But replacement of the inputs of social labor in one form by its inputs in another form is at the basis of any such substitution.

In the area of nonproductive consumption, the requirements are determined not by inputs of social labor, but by the social benefit of the various use values, which are not comparable in their social benefit. For this reason, the interchangeability in this area is extremely limited. Without mentioning clothing, footwear, and items of long-term use, even food products cannot be considered interchangeable if we are aiming at meaningful values. Asking for information in a statistical administration about the demands for food products, V. I. Lenin wrote: "How much bread, meat, milk, eggs and the like a person needs, according to science, must be considered the norm, that is, the norm is not the number of calories, but the quantity and quality of food." (2)

Nevertheless, certain theorists of optimum planning have proclaimed universal interchangeability of material wealth as a principle of the latter, arguing that this is the conduct of consumers in the marketplace: prices have to be changed as a buyer substitutes certain purchases with others. But in the first place, demand cannot be confused with requirements; secondly, it has to be seen that the limits in which the substitution takes place are negligible. No matter how prices are changed, the REQUIREMENTS of the purchaser are decisive in selecting purchases. K. Marx wrote: "...Use value--consumption--has to do with the quantity of a product, not with cost. It is absolutely impossible to understand why I should buy six knives on these grounds and that I can buy them just as cheaply as one knife before." (3)

In our view, a real opportunity exists to develop a target function by taking the incomparability of the components of public welfare fully into account. The ORDER OF MAGNITUDE, the increase in which is in accord with the sets of living standard indicators of more and more quality from the viewpoint of the population's ultimate requirements, is subject to maximization.

The central complex for ASPR [automated control system for planning calculations] problems of the USSR Gosplan is now testing and utilizing a function developed in such a way that a consumption structure of higher quality corresponds to each higher value in it, that is, a structure which approaches more and more closely the structure of absolute requirements, to wit: the magnitude of the target function  $S$ , the value of which is the common independent variable for the functions of per capita norms for consumption of various elements of material wealth, is maximized:

$$(a) (b) (c) (d) \\ V_{is} = V_{i0} + (V_{i1} - V_{i0}) S^t, i = 1, 2, \dots, n,$$

where (a) is the annual consumption of material wealth "i" (of the number "n" in accordance with the product mix of the plan) in calculating per capita in the year planned; (b) is the same in the base year; (c) is the same, with the value  $S$  equivalent to a unit, corresponding to absolute requirements; and (d) is the indicator of degree, differentiated by items of material wealth and thereby providing for a change in the structure of consumption to the extent that (a) draws nearer to (c).

For practical use of the target function  $S$ , linearization of functions (1) may be employed by modifying them in form:

$$(a) (b) (c) \\ V_{is} = V_{i0} + (V_{i1} - V_{i0}) S.$$

where (b) and (c) are the sets of values for per capita consumption of items of material wealth which are close to the real possibilities at the end of the plan period.

In this case, (b) is known to be lower and (c) is higher than these possibilities. They are determined on the basis of an analysis of the functions (1).

Maximization of the magnitude  $S$  means a shift at the same time from the lower levels of welfare to the higher ones and a necessary change in the structure of consumption. For this reason, it is natural to call such a target function the STAGE OF MEETING REQUIREMENTS, not the degree. Stage 0.4 is higher and better for meeting requirements than stage 0.2, but we cannot say that stage 0.4 means a degree of requirement satisfaction that is twice that of stage 0.2. This does not represent a weakness, but on the contrary, an advantage of the target function cited. Inasmuch as universal interchangeability of material wealth does not exist, the changing structure of consumption may only be put in order in a qualitative respect, but it cannot be expressed in some

single units of measurement. For optimization of the plan it is important only to know what kind of structure corresponds to the lower or higher stages of increase in public welfare. Development of functions (1) and (2) makes it possible to look for the chance for a maximum value of  $S$  and thereby establish volumes of production and consumption which advance the level and structure of consumption of various items of material wealth to the maximum at the same time. This is also required for optimization of the plan.

In order to clarify the problem, it is expedient to examine opposition to the legitimacy of plan optimization encountered in the press with the aid of functions (1) and (2). The case is sometimes presented as if in the method cited one variation of a vector of requirements is preferable to another if the relationship  $u_{r}^1 > u_{r}^2$  holds true for at least one "r" component, although among these convenient variations in requirements there are a great many others that are not comparable. Components for requirements "k" and "r" will be found for any pair of them, in which  $u_{r}^1 < u_{r}^2$ .

It should be stressed that only in an abstract approach which disregards the content of long-range planning can "convenient" and "inconvenient" vectors for comparison be obtained. The point is in the comprehensive nature of planning. If the discussion concerns practically unimportant changes in some component (that is, within the limits of the accepted range of accuracy for calculations), then there is no subject for examination. When there is a significant change in some component, the question arises objectively whether the resources required for the change cited have to be applied to improve the entire set of living standard indicators.

One more problem arises: how to evaluate overall fulfillment of the plan for raising the living standard if it is not identical for the various components. An attempt to establish a common percentage of plan fulfillment is not legitimate, as in all cases when the sum total of elements of different quality are involved. Specific qualitative analysis is required in evaluating the deviations of the actual structure of consumption from the one that was planned. And we are in no way excluding the fact that deviations in something may turn out to be needed and that experience may alter the sequence of the shift of indicators from worse to better vectors.

Regardless of the form of the target function, VARIATIONS OF THE PROPORTIONATE NORMS FOR THE INPUT AND UTILIZATION OF MATERIAL AND MANPOWER RESOURCES CONTAINED IN THE PLAN DRAFTS ARE OBLIGATORY FOR OVERALL OPTIMIZATION OF THE LONG-RANGE PLAN. The problem lies in ensuring that they directly enter the system of parameters for the task to the optimum and that the proportions of different production technologies in each sector are determined not at the sectorial level, but as a result of overall intersectorial optimization of the national economic plan. In current planning practice, the norm variations go from ministries and departments to the USSR Gosplan together with draft production plans, in which the proportions of technological variations in producing output have already been determined at the sectorial level in accordance with the products range of centralized planning.

The USSR Gosplan also makes such amendments to the drafts of the technological structure of production, which result from requirements for intersectorial and interregional balancing of the national economy. But the drafts of sectorial plans also may be balanced when there are other technological structures of production, and more numerous ones when long-term planning calculations are involved.

What is the criterion for determining the dynamics of the technological structure of production at the sectorial level? Briefly, it consists of the following: utilizing the limit of the capital investments allocated for the sector in order to ensure that requirements of the national economy are met. Let us note that without data on the limit of capital investments and the increase in requirements for sectorial output over the long term in the period planned, it is impossible to make use of the criterion cited. But these data cannot be obtained at the sectorial level. The so-called preplan balance calculations in the USSR Gosplan determine both the limits of capital investment for ministries, departments and the councils of ministers of union republics and the approximate growth rates for production in accordance with the product range of centralized planning. So all further work on drafting the plan consists of detailing and amendment of the proportions of production development and capital construction that have been determined first.

The current scales of socialist production in the USSR and the dynamism of scientific and technical progress require restructuring of the sequence of planning calculations that have taken shape. Only the initial data available (technology variations in the form of FEMT variations), comparable not at the sectorial but the intersectorial level, are needed for this. Modern computers provide full opportunity for this.

Long-range planning procedure in effect is characterized by the following sequence of calculations: general balance calculations in accordance with the dynamics of social production and its basic sectors; preliminary material balances for the most important types of output, taking into account the materials of the comprehensive program for scientific and technical progress, as well as preliminary plans for development of foreign economic ties; control figures furnished to ministries, departments and the councils of ministers of union republics, including the limits of capital investments and construction and installation operations; draft plans of sectors and republics based on the control figures and amendment of the draft plans; the national economic plan, which contains the entire system of material, manpower and financial proportions. Under such a sequence, the most active elements--the technological changes--vary at the level of sectorial calculations within the framework of proportions determined first, whereas the latter should be determined on the basis of the former.

In our opinion, THE NECESSARY AND PRACTICABLE SEQUENCE FOR PLANNING CALCULATIONS, with the aid of modern computers, should be as follows: variation of the FEMT norms which correspond to the technology variations, taking into account materials of the comprehensive program for scientific and technical progress and its socioeconomic consequences; the unchanging elements of the long-term plan enumerated above (the needs of defense, the norm for construction under way at the end of the period, and so forth); optimum

material and labor, intersectorial, interregional and technological proportions for production which provide for the maximum possible increase in the people's welfare; and optimum changes in the system of prices and economic standards in conformity with the national economic material and labor optimum.

The long-term planning sequence proposed will provide for optimum balance in the national economy, detailed in accordance with the entire system of centrally planned indicators for the long term of three to four five-year plans. Later, the drafting of five-year and annual plans will be guided by specific requirements for the creation of stockpiles, based on the national economic optimum for the long-term future. Of course, considerable space is left within these requirements for multivariate optimization calculations for average-term and current periods for central planning organs and all levels right down to individual enterprises. At the same time, variations of the FEMT norms may be applied for each sector individually. In the course of developing them, programmed special-purpose studies, that is, studies of comprehensive programs to resolve individual national economic problems which involve the technical development problems of a number of sectors, as a rule; the results of scientific and technical, sociological, geological exploration and other such studies on individual subjects in scientific research institutes; planning and design work for the construction of new enterprises and the expansion and renovation of those in operation; and general plans for developing and siting individual sectors are taken into consideration first of all.

Study of these data makes it possible to establish variations for renovation and expansion of operating enterprises and the construction of new ones for each sector. The economic description of these variations consists of a definition of the differences in the FEMT norms of production in a given sector.

At first, possibly, we have to be limited by development of FEMT norms for part of the centrally planned output or for the major technologies in its production. However, without putting it off, we have to begin, even if only experimental testing of applied models of optimization for long-range plans, so that in drafting the plans for the 13th and 14th Five-Year Plans we will be prepared to make use of computer capabilities to implement the 27th CPSU Congress plans for the country's socioeconomic development on the basis of the latest achievements of science and technology.

#### FOOTNOTES

1. Here and henceforth, production will mean not only material wealth, but production and nonproductive services as well; technology will mean the major technological characteristics of production in accordance with the products range of centralized planning.
2. V. I. Lenin, "Polnoye sobraniye sochineniy" [Complete Works], Vol 40, p 342.
3. K. Marx and F. Engels, "Sochineniya" [Works], Vol 26, Part 3, p 119.

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FIELD WORK PROGRESS REPORTS FROM NORTHERN KAZAKHSTAN

Progressive Methods Urged

Moscow SELSKAYA ZHIZN in Russian 15 Oct 86 p 1

[Article by V. Savelyev]

[Excerpt] Relatively favorable weather conditions along with the application of intensive technology on more than 1 million hectares, or on almost half of all plantings of wheat, allowed some rayons and farms to harvest and deliver substantially more than what was planned. For example, the farms of Valikhanovskiy Rayon sent to the procurement enterprises grain equivalent to three annual plans.

The mass application of progressive methods in grain production was once again encouraging. But the transition to their broad utilization requires the urgent resolution of several problems relating to the improvement of the working of the soil and the provision with equipment and new wheat seed of higher quality, especially varieties of the intensive type. The fate of the future harvest, the bases of which are now being established, depends upon how seriously the people in Kokchetav relate to the resolution of these problems.

Fall Soil Preparation Work

Moscow SELSKAYA ZHIZN in Russian 25 Oct 86 p 1

[TASS report: "Right on Time"]

[Text] Alma-Ata, 24 Oct--The farmers of Tselinograd Oblast prepared the fields allocated for the sowing of spring grain crops right on time.

In the entire area of the 2.8 million hectares of grain fields, they worked the soil using subsurface cultivators-deep rippers and harrows of an anti-erosion complex. They applied about 4 million tons of humus prior to the shallow cultivation.

For the republic as a whole, they have prepared 17 million hectares of land for next year's harvest.

## Spring Field Work Advances

Moscow SELSKAYA ZHIZN in Russian 2 May 87 p 1

[Article by V. Savelyev: "Virgin-Land Maneuver"]

[Text] Pavlodar, 1 May 87--The dry fall and the winter with little snow led to a short supply of soil moisture, especially in the southern rayons of the virgin lands near the Irtysh River. Therefore, as soon as the fields dried out a little, the farmers brought out all available equipment to cover the moisture.

The farmers of Sputnik Sovkhoz in Mayskiy Rayon needed 5 days to complete this important process in agricultural technology in an area of 14,000 hectares. The grain growers of Mayak [Sovkhoz] in Pavlodarskiy Rayon and other farms in the oblast kept pace. They finished harrowing with BIG-3 machines in an area of more than 600,000 hectares in a short time. The work front is gradually advancing toward the northern part of the oblast.

Some of the brigades proceeded without delay to the first cultivation of the fallow lands and to plowing the sod of old sown meadows. The maneuver on the spring field is being carried out strictly in accordance with the requirements of intensive technology and the soil-conservation system of farming.

The virgin-land farmers celebrated the 1 May holiday with shock labor in the fields.

## Spring Sowing Under Way

Moscow SELSKAYA ZHIZN in Russian 19 May 87 p 1

[Unattributed article: "They Compressed the Time"]

[Text] Uralsk, 18 May 87--The first half million hectares of the more than 1.5 million planned have been sown in spring crops in the Ural Region of Kazakhstan.

The spring field complex is better organized in Akzhaiksky, Dzhambeytinskiy and Terektskiy rayons than elsewhere. Here they immediately adjusted to the late arrival of spring and to the abrupt rise in temperatures. Farmers in Dzhambeytinskiy Rayon, for example, sowed tens of thousands of hectares in grain crops in just a few hours. The acceleration is being achieved thanks to the clear fulfillment of the orientation of the agro-industrial services toward the extensive use of disk instead of stubble seeders. Under the specific conditions this year, this allows the machine units to go out into the fields earlier and to perform the sowing successfully.

Intensive technologies will be applied on 250,000 hectares.

## Quality Grain Plantings Increase

Moscow SELSKAYA ZHIZN in Russian 20 May 87 p 1

[Article by V. Savelyev]

[Excerpt] Tselinograd Oblast--The shortage of time has once again shown convincingly that it is better to work with fertilizers in the summer, applying them to fallow sections. There is now no problem with such predecessors--just sow. The people of Tselinograd can save a lot of time and resources here considering that they allocated more than 900,000 hectares to intensive technology. For the most part, the wheat is the first or second crop after the fallow.

The precise pace of the intense field work depends to a considerable extent upon efficiency on the threshing floors.

The pace of the work is not causing the farmers to forget about quality; the quality of future grain yields depends upon the fulfillment of contemporary agrotechnical requirements. Last year the oblast sold more grain than planned, whereby 95 percent of the grain accepted by procurers was high-value, strong or hard. More than 50 million rubles were received just for the quality of the harvest. Many rayons expanded the plantings of high-value crops this year.

The largest field of "bezenchukskaya 139" hard wheat in the oblast is located in Astrakhanskiy Rayon. Whereas the average area allocated to it during the years of the last five-year plan was reduced to 4,300 hectares, they allocated 17,000 hectares last year. They will sow 18,000 hectares this year. They intend to ship 14,500 tons of hard varieties of wheat. They did a good job of assimilating the necessary technology.

Now, when the methods of self-financing and self-support [samookupayemost] are getting the upper hand, there is also clearly more attention being paid to this wheat in the oblast as a whole. This is despite certain difficulties in its cultivation. It is obvious that within 1 or 2 years the people of Tselinograd can regain the glory of being large suppliers of an indispensable raw material for the macaroni industry.

During these days, the oblast rayons are sowing hundreds of thousands of hectares daily. But the weather forecasts are inconsistent. Will it suddenly start raining again?

"We cannot get used to it," says Edgard Missal, an agronomist from the Astrakhanskoye Rayon Agro-Industrial Association. "To accelerate the maturing of the grain planted later because of the bad weather, we increase the sowing standards by 10 to 15 percent. We reduce the depth of planting to 5 or 6 centimeters. Fortunately, there is ample moisture. Then the growth speeds up and the plants can catch up with optimum times."

Everywhere one senses the striving of virgin-land farmers to establish a solid foundation for the future harvest. The state has provided them with ample

fertilizer, plant-protection agents and fuel. And now the people are spending their days and nights in the fields.

#### Spring Field Work Delayed

Moscow SELSKAYA ZHIZN in Russian 28 May 87 p 1

[Unattributed article: "A Beckoning Example!"]

[Text] Kokchetav, 27 May 87 (TASS)--The prolonged bad weather disrupted the plans of Kazakh farmers. And this had an immediate effect on the pace of spring field work. It is somewhat behind expectations. Thus, in Kokchetav Oblast, cereal crops have been sown on only 750,000 hectares of plowed fields.

Even here, however, there are many farms that did not submit to the influence of the difficult situation. One of them is Voskhod Sovkhoz in Leningradskiy Rayon. Putting new reserves into operation on time, it places wheat and barley seed on 750 to 850 hectares--the same plowed area previously scheduled--every day, even under unfavorable weather conditions.

#### Good Fall Preparation Stressed

Altma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 5 Oct 86 p 1

[Article by N. Detkin, chief of the agriculture department of the oblast agro-industrial committee: "Foundation of the Harvest"]

[Excerpts] Kustanay Oblast--The last five-year plan convinced the last skeptics of the utility of fallow lands and fall plowing that help to accumulate moisture in the soil. This year it was not necessary to agitate for them but the control over the preparation of the land was strengthened. The results, for example, of the milling of grain from fallow fields cultivated under intensive technology speak for themselves. On the average in the oblast, they now get 18 quintals of grain per hectare and it is 25 quintals per hectare in Komsomolskiy Rayon. Even in the southwest of Ordzhonikidzevskiy and Taranovskiy rayons, the fallow-land yields exceed 19 quintals.

The main concern of the agronomist is the seed. In recent years in almost all grain fields of the oblast, we have been cultivating high-yielding regionalized varieties and only strong and hard wheat. New varieties have been planted on more than a million hectares.

As early as 11 September, Naurzumskiy, Ordzhonikidzevskiy, Semiozernyy and Taranovskiy rayons fully supplied themselves with sowing material.

There are many farms in the oblast where it has become the rule to bring seed only up to first-class sowing condition. Their yield is 2 to 3 quintals higher than that of their neighbors. Everyone knows about this but in Leninskiy and Uritskiy rayons they are delaying the laying in of seed.

This year's harvest confirmed one again that it is higher where its foundation

was laid in the fall. This indicates that along with the harvest it is already necessary to prepare thoroughly for the future harvest.

#### State of Machinery Readiness

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 5 May 87 p 1

[Article by I. Antnov: "Ready to Go in into the Field"]

[Text] Tselinograd Oblast--The machine operators of Novorybinskiy Sovkhoz in Alekseyevskiy Rayon are ready to begin sowing tomorrow if necessary. Here all tractors, cultivators and seeders are now fully ready. The farm was able to cope with the repair of equipment on time because a significant part of the sowing machines and cultivators was put in order immediately after the conclusion of field work. In the winter, machine operators were primarily busy with the restoration of tractors and combines.

The readiness of equipment is high at other rayon farms as well. But such sovkhozes as Trudovoy, Uryupinskiy and Ivanovskiy sovkhozes have been lagging behind. Here they have not yet repaired several powerful K-700 tractors.

The readiness of these machines is low in Atbasarskiy, Balkashinskiy and Seletinskiy rayons. And they are late in repairing seeders in Kurgaldzhinskiy, Vishnevskiy and Krasnoznamenskiy rayons.

#### Harvest Prospects Rated High

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 10 May 87 p1

[Excerpt] Spring arrived in the lands around Aktyubinsk almost 3 weeks late. The grain growers became quite impatient from waiting but now all that is behind them and there is plenty of work to go around. The covering of moisture is under way on a broad front and selective sowing has started in the southern rayons of the oblast--Uilskiy, Khobdinsky, Oktyabrskiy and Alginskiy rayons. They remember on the farms that the sowing was just as late in 1981 but the oblast had an excellent harvest. The villagers have high hopes.

Hopes alone, of course, are not enough to obtain a harvest: this year, as never before, the emphasis was put on competent agricultural methods, intensive technology and the contract. The fulfillment of the first two conditions is not simple but the contract is considerably more complex.

#### Sowing Prepartions, Problems Outlined

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 13 May 87 p 1

[Article under "For the '87 Harvest" rubric: "On the Eve of the Sowing"]

[Text] Kokchetav--The protracted cold spring is compressing the time for spring field work to the limit. Making making maximum use of the time during the day and night, machine operators quickly covered the moisture in the fields.

The sowing is to be performed on an area of 3,200,000 hectares, more than 1 million of which will be in wheat cultivated under intensive technology. Much has been done in the course of the preparation for the important campaign: most of the land was worked in the fall and 739 field brigades covering 92 percent of the plowed area will work under the collective contract. This year they have received more mineral fertilizers and effective herbicides for the fight against weeds. The sowing of grasses is being expanded.

As mutual checks has sown, however, they did not prepare well for the sowing everywhere. They still have not repaired a portion of the "Kirovtay," for example. At Yuzhnyy and Saryadyrskiy sovkhozes, the grain seed is third class. In connection with the peculiarities of the spring, technological charts are being made more precise and work plans are being discussed at meetings of machine workers.

The sowing will basically be done in two shifts. Many brigades have planned to use wide-coverage machine units.

#### Spare Parts Imbalances

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 17 May 87 p 1

[Excerpts] Kustanay--Taking corrective actions, grain growers as well as their partners have begun this year's sowing of grain in the oblast.

On the farms, the permanently assigned brigades are involved in technical care. The enterprise stocked up on the necessary supply of reserve machine units for the sowing period. They declined to distribute spare parts according to the schedule of allocations, which led to an excess of some parts and to a shortage of others. They are now being allocated only upon request.

Most sovkhozes and kolkhozes in the oblast are sowing grain crops.

#### Preparations for Increased Productivity

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 19 May 87 p1

[Unattributed article: "Key to Success"]

[Text] Tselinograd--The farms of Vishnevsky Rayon are speeding up the sowing of grain crops. The late spring created additional problems but all measures are being taken to complete the sowing in 7 to 8 working days. It is being done in two shifts on all farms. Section agronomists are working on the machine units to help out machine operators.

The farms have established control areas where they carry out all types of preparations for the work of tractors and seeders. The result is an increased shift productivity of machine units and higher sowing quality. Much attention is being paid to the work of chemical-applications centers: they are calibrating fertilizers, treating seed and removing impurities from it.

## Efforts Against Idle Time

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 20 May 87 p 1

[Unattributed article: "Strutting Intolerable"]

[Text] With the onset of warm sunny weather, there has been a sharp increase in the rate of sowing of grain and legume crops in the fields of East Kazakhstan. In just a few days, the increase in sown areas here amounted to more than 100,000 hectares. The seed is in the ground in a third of the sowing area.

The farmers of Tarbagatayskiy Rayon are leading in the oblast competition, already have sown three-fourths of the areas allocated to spring wheat, barley and peas. The managers of farms here and the workers of rayon agro-industrial associations saw to it that the field brigades could work without idle time. Foremen of mobile units are helping them to carry out preventive measures and to repair equipment. Tractors are being refueled and seeders filled with seed directly in the fields. Workers in cooperatives and public catering have seen to it that the sowers are fed on time and have the daily necessities at the field camps.

The machine operators of Zaysanskiy and Kurchumskiy rayons are also sowing efficiently and without idle time. Here the seed has been planted in more than half of the area. Compared with last year, they have significantly expanded the area in wheat and barley cultivated under intensive technology.

The farms of Samarskiy, Shemonaikhinskiy, Glubokovskiy and Bolshenarymskiy rayons are losing valuable time. To be sure, some of the fields allocated for grain crops are located in the piedmont, where the sowing is being done selectively. But the work is going slowly even in the broad steppe areas and there are frequent interruptions in the supply of fuel and seed.

## Shortage of Machine Operators

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 26 May 87 p 1

[Article by V. Zhuk]

[Text] Aktyubinsk Oblast--Grain crops have been planted on the biggest part of fields in Aktyubinsk Oblast. The sowing of early crops is finished in the southern rayons--Oktyabrskiy, Uilskiy and Temirskiy rayons. But the pace of the field work is slow in the main grain-growing rayons--Komsomolskiy, Aktyubinsk and others.

"Because of the late spring, several agricultural measures were superimposed," says F.D. Karpov, deputy chief of the agricultural section of party obkom. "But it is impossible, of course, to justify such sluggishness. Sometimes the farms themselves are guilty."

In Aktyubinsk Rayon, they do not meet the work schedules even in good weather. We spoke with A. Usov, brigade leader of the first tractor and field-work brigade of Kolkhoz imeni Lenin, about the reasons for the slowness.

"This year we increased the area planted in oats. We coped with it. The concern now is wheat. We decided to cultivate 1,500 hectares of it under intensive technology. It cannot be said that we have assimilated this technology. There is a certain difficulty in doing so. But the main thing is the shortage of machine operators. We are short 10 tractor drivers for normal work. For this reason, we are working under the mending-holes principle. We have now put all of our efforts into the sowing. The situation was the same last winter, when it was necessary to apply organic matter to the fields. We are now missing the best time for the sowing. What kind of intensive technology can this be?"

A. Usov's brigade is considered to be a contract brigade. But this is formal. It has no independence. They forced it, for example, to assimilate saline soils. The way things are in the brigade, it is better for it not to take action, not to waste the effort in vain.

Such mindless planning of the structure of plantings was also encountered on other farms in Aktyubinsk Rayon. The field work itself is even worse organized. Because of this, there is considerable idle time of equipment. No concern is being shown about people. How, after this, can one expect productive work?

#### More Rye Sown

Moscow SELSKAYA ZHIZN in Russian 1 Nov 86 p 1

[TASS item: "They Expanded Rye Sowings"]

[Text] Alma-Ata, 31 Oct--The farmers of Kazakhstan completed the planting of winter crops on a area of about 2.5 million hectares, 160,000 hectares more than planned. The entire increase in winter crops this fall is due to rye, the sowings of which were expanded by one-third. And this is no accident.

The increase in the popularity of this important crop is due to the increased demand for its baking industry. The first to respond to the demands of this sector were the rayon agro-industrial associations of Uralsk and Vostochno-Kazakhstanskaya oblasts. Having considered their possibilities, they almost doubled the plantings of rye last year.

#### New Grain Variety Introduced

Moscow SELSKAYA ZHIZN in Russian 17 Jan 87 p 1

[TASS item: "Seed Inspected"]

[Text] Alma-Ata, 16 Jan--The seed inspectorates of Kazakhstan have completed the inspecting of the graded seed of winter crops intended for intensive technology. It is all of the first and second classes. The republic's grain growers are now expanding the scale of the introduction of this effective technology to 5.5 million hectares, one-fourth of the spring grain field.

Especially popular among farmers is "irtyzhanka 10," which this year will occupy a third of a million hectares in the industrial sowings of Severo-Kazakhstanskaya and Kokchetav oblasts. The grain growers are replacing "saratovskaya 29," an old inhabitant of the fields here, with the intensive variety, which has a better yield.

#### Inadequate Seed Quality Indicators

Moscow SELSKAYA ZHIZN in Russian 27 Mar 87 p 1

[Article by V. Savel'yev under "Spring Day--to the Harvest" rubric: "Average Figure: Is It Not Lulling Agronomists and Seed Growers to Sleep?"]

[Text] North Kazakhstan--With manager N. Sokolov, we entered the solid storehouse, where the seed of S. Kalita's brigade is being stored. Two huge piles of wheat rise almost to the roof. On the board to the left, one reads: batch number two, weight 441 tons, variety "tselinnaya 21," first reproduction, first class. There is good seed in the second pile as well, where 759 tons are stored.

Over the last 2 years, the farmers of Akmolinskiy Sovkhoz and of the entire Tselinograd Poultry Association, of which this farm is a part, did not fail to obtain less than 2 tons of grain per hectare. And they achieved such yields because they work a great deal with seeds here--practically the year round.

Most Tselinograd sovkhozes and kolkhozes also manage seed stocks well. In the oblast, they layed in the required quantity, 430,000 tons. And 99 percent is certified grain.

The farmers of Severo-Kazakhstanskaya Oblast have more worries. Because of the poor fall weather, the seed did not mature at a number of farms here, it being damaged by frosts. It was necessary to fill up the stock with commodity grain and it is now necessary to replace a significant part of the seed with seed of better quality.

In Pavlodar Oblast, 97 percent of the seed of grain crops has been brought up to good sowing conditions. The quantity of first-class material increased by almost 14 percent. The farmers of Kokchetav Oblast also prepared rather well. This year, Kuybyshev Rayon as a whole and more than 100 sovkhozes and kolkhozes, for example, will sow wheat and barley with seed of the very highest quality.

Nevertheless, the generally favorable figures frequently conceal ordinary negligence. Take Kokchetav Oblast. Last year, thanks to the application of intensive technology, they threshed about 600,000 additional tons of grain here. That would seem to be quite a lot. But the fact is that did not reach the expected yield. One of the reasons is poor seed. And this year, Kenashchinskiy, Krasnoflotskiy, Karatalskiy and a number of other sovkhozes intend to use low-quality and even substandard sowing material.

Or take another example. The largest grain rayons in Tselinograd Oblast, Atbasarskiy and Makinskiy rayons, which must make broad use of intensive technology, have only 88 and 84 percent high-quality seed, respectively. Neither is everything as it should be in Pavlodar Oblast: only 25,300 of 30,400 tons of seed can be considered suitable for the intensive field. Today attention is again being drawn to the fact that there are no new promising varieties capable of recouping the expenditures for mineral fertilizers and up-to-date plant-protection means through a high yield.

The farms of North Kazakhstan are utilizing the achievements of the plant breeders of two institutes--the VNIIzKh [All-Union Research Institute for Grain Farming], which is located in the community of Shortandy in Tselinograd Oblast, and the SibNIISKh [Siberian Agricultural Research Institute] in Omsk. The Siberians are more diligent and often their varieties are often used in production even before they are officially recognized. The result is an increase in the grain yield. The Shortandy scientists rely for everything on instructions that are clearly holding up progress. Even though the plant breeders of the VNIIzKh developed the "virgin-jubilee" wheat! But they do not plan to regionalize it until next year.

Some agronomists console themselves with the overall line in the reports, the mean indicator on the presence of certified seed. With a minimum of such first-class seed and a maximum of second-class seed, it is possible to appear quite decent! Unfortunately, a reason for such complacency is also provided by the official system for calculating quality indicators, which, in the opinion of many specialists, has fallen behind the demands of the day. Take even the limits for the content of impurities established by the All-Union State Standards. They permit the presence of five seeds of wild oats per kilogram of first-class seed. For second-rate sowing grain, this indicator is already 20. Consequently, under the existing standards for "proper" sowing, each hectare of field will have more than 2,000 seeds of one of the most pernicious and difficult weeds to eradicate! It is not difficult to imagine the situation if one considers that one plant of wild oats is capable of producing 300 to 350 caryopses, which then germinate over many years. So it turns out that everything appears good on paper but in the fields it is a "green fire."

The All-Union State Standard is also indulgent toward the germination indicators for seed of the first and second classes. It is enough for 90 and 87 percent to germinate, respectively. But the requirements for the presence of crushed grain are unjustifiably high--1.5 percent. For the first class, such an impurity is harmless and even in the range of 3 to 5 percent it can be compensated with no special outlays by increasing the sowing standard. All the more so since the content of the admixture is a direct reflection of the imperfection of the machinery used on the threshing floors for cleaning the seed. To separate wild oats, for example, it must repeatedly be passed through obsolete and unproductive ZAV-40 machine units.

So be it. If one has to choose, it is better to sow a field with grain having an increased content of crushed seed but free of weeds than to sow it with whole grain mixed with wild oats. The seed will then better meet the true qualities of the first class. That is what all agronomists think!

### Wheat Planting Completed

Moscow SELSKAYA ZHIZN in Russian 2 Jun 87 p 1

[TASS item: "Reserves in Action"]

Alma-Ata, 1 Jun--Yesterday the farmers of Kazakhstan completed the sowing of wheat in the entire planned area of almost 14 million hectares. The weather conditions this spring were very difficult. Cold and bad weather made it impossible for farmers to cover the moisture and to apply fertilizer prior to the sowing campaign. This work had to be done at the time of sowing.

In the cultivation of the wheat, Kazakhstan grain growers relied on intensive technology, which produced an increase last year of 5.5 quintals of grain per hectare. On almost 40 percent of the area, the main food crop was planted on fallow lands or as a second crop after lying fallow. High-yielding strong and hard varieties were sown. The warmth and abundance of moisture contribute to the rapid germination of the seed. Harmonious sprouts have already been obtained on the largest part of the wheat fields.

### Better Land Use Indicated

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 16 May 87 p 1

[Article by an unidentified KazTAG correspondent: "On the Main Grain Field: For the 1987 Harvest"]

[Text] An extremely important phase of the work has begun for the grain growers of the northern oblasts, the republic's main granary: they have begun the sowing of wheat.

The appeal of the Kazakhstan Communist Party Central Committee to all workers of the agro-industrial complex published on the eve [of the sowing campaign] set the task of growing no less than 29 million tons of grain this year. Conditions appear favorable for this. There is a good supply of moisture in the soil. To be sure, the spring was late but the provision of herbicides against wild oats made it possible to begin the sowing campaign without deviating even a single day from the time recommended by science.

All operations are being carried out in an integrated manner. In connection with the fact that it is necessary to apply fertilizers and plant-protection agents in time, destroy weeds and get the seed in the soil, all sovkhoz and kolkhoz machine operators as well as those invited from sponsoring enterprises and organizations got behind the controls of tractors. The machinery is being used day and night.

There is a special approach to fields where wheat will be cultivated under intensive technology. Five million hectares, more than one-third of all the sown area of the basic food crop on virgin lands, are being provided for such fields. Here fertilizers were applied ahead of time, during the period of the preparation of the fallow lands. They basically are putting out first-class seed of strong and hard varieties.

An analysis shows that as yet only about 40 percent of virgin-land farms are oriented toward advanced agricultural technology and production technology in farming. There are still many weedy fields and crop rotations have not been completely assimilated.

The demands on the soil-conserving system of farming are not being fully carried out for various reasons. Fallow lands are not being cultivated to the extent necessary.

It turned out, for example, that in Aktyubinsk Oblast they included in fallow lands fields not at all suitable for farming. There are farms in Severo-Kazakhstanskaya and Kokchetav oblasts that are sowing seed of poor quality. Among them are Yuzhnyy and Saryadyrskiy sovkhozes, where a significant part of the seed is third class.

The experience of advanced sovkhozes and kolkhozes and the results of scientific experiments show that virgin-land farmers have possibilities for raising the stability of grain production and they must make maximum use of them.

#### Conference on Increasing Production

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 19 May 87 p 1

[KazTAG item: "With Concern About the Future Harvest"]

[Text] A conference was held on 18 May in Kokchetav, in which the first secretaries of the party obkoms and the chairmen of the oblispolkoms of Kokchetav, Kustanay, Severo-Kazakhstanskaya, Turgayskaya and Tselinograd oblasts took part. They discussed the tasks of the party, soviet and economic authorities of the republic's northern region in the further increase in the production of grain and fodder and in the fulfillment of the plans and socialist obligations for 1987.

The participants in the conference listened to the information on the matter at hand by A. Rybnikov, secretary of the Kazakh Communist Party Central Committee.

G.V. Kolbin, first secretary of the Kazakh Communist Party Central Committee, spoke to those meeting.

A report on the conference will be published in the press.

9746  
CSO; 1824/286

## POLTAVA OBLAST SEED PROBLEMS DISCUSSED

## Low Seed Quality

Moscow SELSKAYA ZHIZN in Russian 15 Mar 87 p 1

[Article by N. Demikhovskiy, Poltava Oblast: "Is Such Seed Really Necessary?"]

[Text] The quality of corn seed grain continues to remain very low in Poltava Oblast. Why?

The tremendous potential of corn is well known in the traditional regions of corn cultivation. Even during last year's unfavorable conditions, dozens of farms in various zones throughout the oblast obtained an average of more than 50 quintals of corn grain per hectare. This indicator was even better for the corn growers in Velikobagachanskiy Rayon. Here, at the Zarya Kolkhoz, the average corn yield exceeded 86 quintals and at the kolkhozes Engels and imeni Kalinin -- 70 and 67 quintals respectively.

This is not the first time that results such as these have been obtained in the region and this provides the basis for undertaking the obligation of obtaining 53-55 quintals of corn grain from each of more than 6,000 hectares this year. Other rayons, in particular Khorolskiy, Lubenskiy, Lokhvitskiy and Mirgorodskiy, also intend to raise their yields noticeably. The farmers are basing their plans on a realistic factor -- experience.

What is the essence of this experience? In replying to this question, the workers in Poltava Oblast necessarily single out the role played by the increasing culture of farming and the importance of the industrial technology being employed in all areas and of good personnel training. And they place special emphasis upon an aspect of priority importance -- the selection of highly productive hybrids.

This obligation rests mainly with the oblast strain testing network. It studies 40-50 hybrids annually. The specialists in the oblast's agricultural administration are not wasting their time. They are also searching for domestic plant breeding achievements and particularly in those areas which conform with Poltava's soil-climatic conditions. They monitored corn "polygons" at Kiev, Kharkov, Dnepropetrovsk, Cherkassy and in Moldavia and

thereafter they tasked the oblast's best farms with checking upon the new developments as they appeared.

Over a period of a number of years, the following hybrids were selected for cultivation for grain purposes: Dneprovskiy 273 AMV, Dneprovskiy 203 MB and Dneprovskiy 320 AMV. They are distinguished by relative early ripening, good productivity and a high degree of attachment and non-wilting of ears, a factor which is of great importance for mechanized harvesting. Finally, these hybrids are distinguished by simplified seed production operations.

"Never before have I encountered anything of this nature in Poltava Oblast" stated the chief of the oblast inspection for strain testing, Doctor of Agricultural Sciences V.D. Medinets.

Once the hybrids were regionalized, they began creating seed funds for their cultivation throughout the oblast. The Poltava workers received assistance from Moldavia. And already this year, according to data supplied by the oblagroprom [oblast agroindustrial committee], Poltava Oblast is able to sow 80 percent of the area intended for the cultivation of corn for grain using its own seed for highly productive hybrids. The future plantations have already been topped off with fertilizer and the equipment made ready.

It appears that everything is in order and it is merely necessary to wait until the arrival of spring. But this is not true. The fact that more seed has been procured than ever before is arousing serious alarm among the farmers. Many recall how low quality seed last year resulted in having to carry out considerable resowings in a number of areas and also in sparse seedlings appearing over large areas.

A machine operator attached to the Mirgorod Kolkhoz imeni Chapayev I. Matveyenko recalls how poor seed spoiled the fine results which he had anticipated last year.

"They referred to it blatantly as the golden fund of the harvest! And actually it was nothing more than bags of rubbish" he stated during an election meeting at the kolkhoz.

During a discussion I had with him, roughly the same statement was made by the well known Poltava chairman of the Kolkhoz imeni Lenin in Chutovskiy Rayon, Hero of Socialist Labor I. Popavka:

"A mishmash of grain stumps and lumps."

But perhaps we should not mill last year's grain? Unfortunately, the facts contained in this year's summaries by the rayon state seed inspections are forcing us to do this. They are painting a truly depressing picture with regard to the status of the corn seed intended for cultivation for grain purposes.

The situation is most alarming at the Gadyach Corn Grading Plant. This enterprise, similar to others, exceeded its procurement plan having obtained 5,000 tons of seed prior to the beginning of March. However, it graded and

turned over for inspection less than one fourth of this amount. Moreover, only 15 percent was categorized as being of 1st class quality, 33 percent -- 2d class, almost one half -- 3d class and 15 percent -- generally considered to be non-germinating. At the Lazorkovskiy plant in Orzhitskiy Rayon, almost all of the seed procured was graded. But in terms of quality, the seed was far inferior to the Gadyach seed -- only 19 percent met the standard for 1st class, approximately one half was of 3d class quality and 6 percent was sub-standard.

There is still another example of the surprising disparity between the amount of seed procured and its suitability for sowing. Farms supplied the Globino Grading Plant with 6,400 tons of seed -- twice as much as the amount called for in the plan. But by March only one third of this amount had been graded and of this amount only 23.4 percent was adjudged to be of 1st class quality, with more than one half being of 2d and 3d class quality. Twenty percent was declared to be of sub-standard quality. Throughout the oblast as a whole, one half of the seed remained ungraded by the end of March. Of the seed which had been prepared for sowing, the inspection determined that 53 percent was of 1st class quality, 41.6 percent was of 2d and 3d class quality and the remainder -- reject material. It turns out that the grading enterprises are still far from the goal which they undertook for themselves -- to improve 80 percent of the hybrid seed to 1st class quality. Yes and you can readily see that the rates for preparing the seed cannot be considered as satisfactory. This is a natural phenomenon when one takes into account the limited capability of the grading plants and their old and worn out equipment, which tends to crush the grain and does a poor job of separating out the coarse impurities.

Certainly, many complaints can be addressed against the enterprises of the Ministry of Grain Products for their weak technological discipline and organizational miscalculations. But in all fairness it must be stated that a considerable portion of the guilt rests with the farms that supply the plants with hybrid seed. Some of them are not displaying the proper degree of responsibility in carrying out this work of tremendous importance. Last year was especially significant in this regard.

The crop that was cultivated, I repeat, made it possible to exceed almost by twofold the state task for seed production. Yet they applied themselves to this task as though it was a heavy burden. They displayed haste in piling up the ears in poorly processed form in the yards of the grain products enterprises. So it was in Gadyach, Globino, Orzhitsa and other areas -- in those areas where seed quality is very low at the present time. The procurement specialists, in a search for storehouse facilities -- there were not enough for this harvest -- were forced to carry out continuous inter-rayon shipments, now and then loading and unloading the seed, which did not at all improve its "health." It reached a situation wherein even in February, owing to the shortage in storehouse facilities, some areas were forced to store the seed outdoors!

These then were the inputs which led to the formation of piles of poor quality seed. True, the Poltava workers believe that they will be able to get by with this type of seed. But does it necessarily follow that those who obtain the seed from them will be satisfied? Nobody is pleased by such a prospect.

Beyond any doubt, the Poltava workers have in recent years accomplished much towards ensuring that corn grown for grain purposes occupies a proper place on the oblast's grain fields. But an increase in the yields cannot be achieved if improvements are not realized in a decisive element of the technological chain -- seed production.

This is of special importance to Poltava Oblast in view of the fact that it is responsible for the condition of the seed and, it follows, to a considerable degree for the fate of the corn harvest in other regions of the country.

#### Measures To Be Undertaken

Moscow SELSKAYA ZHIZN in Russian 13 May 87 p 1

[Article by F. Morgun, secretary of the Poltava Oblast Committee of the Communist Party of the Ukraine: "Responsibility of the Ministry"]

[Text] The article published on 15 March under the headline "Is Such Seed Really Necessary?" has been examined by the bureau of the Poltava Oblast party committee. The criticism has been adjudged to be fair and complaints have been registered against the chief of the oblast's grain products administration P. Oleynik and the deputy chairman of the oblagroprom [oblast agroindustrial committee] S. Moskalenko for having exercised only weak control over the preparation of hybrid corn seed. At the present time, the mentioned departments have undertaken specific measures for correcting the shortcomings and, as a result, the yield of 1st and 2d class seed has been raised to 67 percent.

Measures are also being undertaken aimed at regulating the network of seed production farms, coordinating seed production with the drying capabilities and ensuring the timely and high quality preparation of the logistical base for accepting the hybrid corn seed of the 1987 harvest. Measures have also been approved by the oblast's grain products administration for strengthening the logistical base for the acceptance and processing of hybrid seed through to the end of the current five-year plan.

At the same time (and this was emphasized in the article), the bureau notes that the capabilities of the corn processing plants at the present time are not in keeping with the increasing production volumes for hybrid corn seed. Enterprises built more than 25 years ago are not very productive, their equipment is obsolete and worn out and constantly maintained in operating condition only by virtue of the efforts put forth by a plant's workers and engineering-technical personnel. A number of modernizations and modifications have been carried out. In particular, the drying capabilities have been expanded, large vehicle-mounted unloaders have been installed and storehouses have been equipped with forced ventilation. Solutions have been found for the problems concerned with the primary cleaning and selection of corncobs at pneumatic columns.

But these are all half-measures. Only the Ministry of Grain Products for the UkSSR can achieve a firm solution for the problem. It has plans to modernize

seven of eleven enterprises in Poltava Oblast prior to 1990 and yet it appears based upon the current work rates that a longer period of time will be required. Just as in the past, solutions are not being found for such problems as logistical supply for the plants or ensuring the availability of spare parts for existing technological equipment. The situation with regard to grading units, the resources available for graders and separators and marking machines is especially complicated. The quality of the packing operations is low.

The buildings of the grading shops and dryers are in need of capital-restorative repair work. Solutions have yet to be found for automating the production processes and for mechanizing the loading of finished products into railroad freight cars and the shops lack heating and water supply systems. The same holds true concerning the construction of needed storehouses having forced ventilation systems. And there are absolutely no plans for the erection of silage type storehouses.

All of this is adversely affecting the productivity of the corn processing plants and the quality of the hybrid seed.

7026  
CSO: 1824/270

## PEST FORECAST, CROP PROTECTION CAMPAIGN IN RSFSR, UKRAINE

UDC 63.551.509:581.2:632

## North Caucasus, Central Chernozem Pest Forecast

Krasnodar SELSKIYE ZORI in Russian No 4, Apr 87 p 27

[Article by A. Yermakov, director of the forecasts laboratory of the All-Russian Plant-Protection Research Institute; and senior scientific workers N. Mikhaylova and N. Burova under "Plant Protection" rubric: "Such Is the Forecast"; first paragraph is SELSKIYE ZORI introduction]

[Text] What now threatens the cereal and legume crops? How can agricultural crops be protected against dangerous pests and diseases? This is a subject for scientists.

The harmful shield bug will be the main pest to grain crops this season in the rayons of North Caucasus and in Voronezh and Belgorod oblasts. The number of wintering bugs was high: a maximum of 300-328 specimens per square meter in Voronezh Oblast and 72-180 in Stavropol Kray and Rostov Oblast. Even if a significant part of the population of the shield bug perishes in the extremely severe winter that is characteristic of the entire Central Chernozem, the danger of a high degree of damage will remain, especially under the conditions of a warm dry summer. It is recommended that chemical treatments of plantings of strong and hard wheat be carried out at the beginning of the ripening of the grain when there are more than five larvae per square meter, during the time of milky maturity during drought when there are more than two and, in wet years, when there is more than one larva in the same area. First of all, it is necessary to harvest the plantings of strong and valuable wheat, to mow around the fields, and to store the grain from these fields separately. This will significantly reduce the level of damage to grain and the number of shield bugs.

By the fall of last year, grain beetles became less numerous. But local infestations where they were numerous remained in the North Caucasus and in individual rayons of Belgorod and Kursk oblasts, especially on plantings of winter crops after cereals. Considering the danger from this pest, it is necessary to inspect these crops carefully. In combating the grain beetle, it is essential above all to observe crop rotations. Most of its eggs and

larvae can be destroyed through the cultivation of clean fallow lands, the breaking of stubble and plowing. The early and expeditious harvesting of grain crops and the timely destruction of fallen seed deprive the pest of food and reduce the number of larvae. Chemical treatments are performed in the spring when there are three to five larvae per square meter.

Cereal leaf roller moths are widespread in Krasnodar Kray. Although its numbers have declined somewhat, this pest continues to be dangerous for winter wheat here. Chemical treatments must be carried out in the phase of bushing out or heading when the population reaches 50-60 caterpillars per square meter.

Significant damage from the leaf beetle is expected on plantings of grain crops in the North Caucasus with local damage in southern and southeastern rayons of Belgorod, Voronezh and Tambov oblasts. Here it is expedient to treat during the phase of bushing out when there are 10 to 15 beetles and in the heading phase when there are 3 to 5 larvae per square meter.

Bread beetles are dangerous for most rayons of Voronezh Oblast, the southeastern rayons of Belgorod Oblast and individual rayons of Lipetsk Oblast. Local harm is possible in the south of Tambov Oblast. In rayons where the number of beetles is large, one cannot dispense with the cultivation of bare fallow lands to a depth of 14 to 16 centimeters with subsequent rolling, the breaking of stubble after the harvest and early deep fall plowing. This will lead to the destruction of 40-50 percent of the eggs and larvae of bread beetles. The chemical treatments against the beetles are mandatory when their number per square meter exceeds four in a border infestation and two beetles in a continuous infestation.

Significant harm is possible from grain sawflies in North Caucasus, especially on fields where grain crops are cultivated two or three consecutive years and the soil is worked without a moldboard.

The striped grain flea can be expected to damage spring wheat and barley in the oblasts of the Central Chernozem Region when the spring weather is hot and dry. Chemical treatments against it are carried out in the phase of the sprouts when there are 300 insects caught in 100 waves of an insect net or 30 per square meter.

The spring cutworm will (as in 1986) cause damage on the plantings of spring grain crops and corn in Tambov and Lipetsk oblasts and possibly locally in Voronezh Oblast. The measures to combat it are agrotechnical: grain crops must not be sown after other grain crops and it is necessary to destroy grass weeds, to break the stubble immediately after the harvesting of the grain, and to perform deep fall plowing with the turning of the sod.

Of the polyphagous pests, the most dangerous to grain crops in the spring period are the murine rodents (in North Caucasus).

There may be occurrences of wireworms and undercutting cutworms in very weedy fields of grain crops and corn and of the European corn borer on corn in the North Caucasus zone.

In May and June, with a favorable overwintering of winter crops and optimum conditions (temperature 15 to 25 degrees Celsius and humidity over 50 percent), the increased development of brown rust is probable. The early manifestation of the disease in the spring and the reaching of a maximum during the phase of the ripening of the grain threatens to be most damaging.

There is a danger of a significant spread of mildew at a higher temperature (15 to 20 degrees) and humidity of no less than 50 percent during the period of the maturing of the winter crops and subsequent to this. Brown rust and mildew will appear above all on neglected plantings, in sections with superfluous nitrogen fertilizer, on varieties susceptible to these diseases as well as in low-lying locations.

The development of septoria leaf spot is possible in North Caucasus and in individual rayons of the Central Chernozem. The disease can become epiphytic if there is abundant precipitation in the first half of the growing season. Prophylactic treatment is carried out upon the formation of one or two pustules of brown rust per leaf and the appearance of the first spots of mildew and septoria on the growing leaves. And systemic compounds (bayleton, tilt) are needed when there is a combination of these diseases. In the event that only brown rust develops, one can treat the plantings with compounds having a protective action (tsineb, polikarbatsin). Against mildew alone, one can use colloidal sulfur. The chemical defense subsequently includes systemic fungicides taking into account the forecasted development of the diseases and at the signal of the forecast centers.

Smut diseases are expected to appear on grain crops everywhere, most of all wheat and barley smut, inasmuch as the reserve of the infection is adequate, especially where untreated seed and seed from government stocks was sown. The degree of infection of the plantings can be reduced only when the seed is treated with systemic compounds (vitavaks, baytan, fundosol). Only parcels free of smut infection must be allocated for seed purposes.

Root rot on grain crops will also appear everywhere and will be most significant where there is a shortage of moisture in the soil and in sections where the agricultural technology is poor. Treating the seed with fundozol, baytan or granozan is effective as a protective measure against these kinds of rot. In case of the intensive occurrence of root rot during the time of the growth of winter crops, it is necessary to treat the plantings with fundozol: it is sufficient to treat once during the bushing out and heading phases.

There may be an intensive development of pea aphids on pea plantings in all Central Chernozem oblasts and in North Caucasus during warm and moderately moist weather. Chemical treatments are advisable after the establishment of the size of the useful entomofauna and the degree of infestation of the peas by the aphid. The pea weevil will be dangerous in Voronezh and Tambov oblasts. One can protect against it by means of fumigation. In the budding

phase, it is effective to treat the plantings with compounds when 15-20 weevils are caught in 10 waves of an insect net.

Tuber weevils have become common pests in the oblasts of the Central Chernozem. Although the new generation was not numerous because of the hot dry weather during the period of the egg laying, nevertheless in a hot dry spring there may be weevil damage to pea sprouts. They are treated with compounds when there are 10 to 15 weevils per square meter.

#### Crop Protection in the Ukraine

Moscow SELSKAYA ZHIZN in Russian 9 Jun 87 p 1

[Article by N. Rubets, head of the plant protection administration of the Ukrselkhozhimiya Association of the Ukrainian SSR State Agroindustrial Committee, and M. Lesovoy, director of the Ukrainian Research Institute for Plant Protection: "An Urgent Task Is Now Facing the Farmers in the Struggle Against Diseases and Pests of Cereal Crops"]

[Text] Rains fell and the air temperature was moderate at the end of spring and beginning of summer in most agricultural regions of the European part of our country. Such conditions are very favorable for the mass appearance of different types of diseases on cereal crops. Losses in yield because of them can reach 20 percent or more. It is therefore necessary to protect the plants dependably and above all their flag leaf and ear, the most important organs forming the harvest.

Mildew represents a particular threat in all zones of the Ukraine, especially on crops cultivated under intensive technology. It affects mainly the leaves of the lower and middle levels. Septoria leaf spot, brown rust, Cercosporaella rot and other diseases have also been detected. A dangerous situation! The agronomic services of the farms under the leadership of rayon plant protection stations must take urgent measures.

The primary task is to inspect without delay the plantings of winter wheat, rye and barley. When they are affected with the diseases mildew, rust, septoria and Rhynchosporium leaf scald and when the ear is threatened, it is advisable to utilize the general-purpose fungicide tilt. Bayleton or tozonit should be applied when there has been a severe attack by mildew or rust and fundazol should be used on fields where mildew and Cercosporaella are widespread. The average standard use of these compounds is 0.5 kg per hectare. If the plants are strongly affected with mildew, the standards are increased: fundazol to 0.6 and bayleton to 0.08 kg per hectare.

Besides the indicated systemic compounds, contact fungicides are also used on the plantings of winter wheat: tsineb or polikarbatsin (at the rate of 4 kg per hectare) to diminish the harm from rust and colloidal sulfur (6 kg per hectare) against mildew. Also effective is a tank mixture of fundazol with tsineb or polikarbatsin (0.5 and 4 kg per hectare, respectively). It should be remembered that the greatest efficiency from systemic fungicides is obtained on highly productive crops planted following good predecessors.

Therefore, they primarily use them to treat crops cultivated under intensive technology.

The hatching of the larvae of leaf beetles and the mass laying of eggs of the harmful shield bug have begun on winter wheat and barley in the steppe zone of the Ukraine. In protecting the crops against diseases and in the conformity of the timing of the campaign with the pests, it is essential to add insecticides in the recommended doses to fungicides. The treatment of the plantings with fungicides and insecticides is carried out with the tractor rod sprayers OPSh-25, OP-2000-0.1, POM-630 and others. The working liquid is prepared on stationary solution assemblies or with the help of portable units. The expenditure of the working liquid is 300 liters per hectare in the fight against diseases and 100-200 liters per hectare in combating pests.

The rod sprayers must be fitted with diffusers of the slit type. They are set up so that the spray is aimed backwards by 5 to 10 degrees. The height of the sprayer rod over the crop being treated is about 50 to 60 centimeters. Spraying is done when the wind velocity is less than 4 meters per second. For the efficient use of the equipment and the effective treatment of the fields, it is necessary to organize the work of machine operators in two shifts and to observe safety procedures.

Of the 5 million hectares of winter wheat designated for protection against diseases, 3.5 million hectares in the Ukraine had already been treated as of 4 June. Dnepropetrovsk farmers were the first to cope with this urgent work. The grain growers of the forest steppe zone are close to achieving this. At the same time, the winter wheat has been treated on less than half of the area on the farms of Zaporozhye, Krymsk, Nikolayev and Voroshilovgrad oblasts.

Many of the republic's kolkhozes and sovkhozes have begun the second spraying of crops with protective compounds.

The strict fulfillment of all technological procedures and rules for the use of fungicides and insecticides is an important condition for the dependable protection of harvests.

9746

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## WEATHER, CROP DEVELOPMENT REPORTS FROM BELORUSSIA

## Cold, Wet Conditions Prevail

Minsk SELSKAYA GAZETA in Russian 25 Apr 87 p 1

[Article: "Weather and Plantings"]

[Text] Just a week remains until the end of April but real spring warmth is not yet being felt. Only in recent days under the influence of warm air from the Atlantic has it warmed up somewhat in the republic. It will soon turn cold again, however.

The transition of the average daily air temperature beyond +5 degrees is being delayed by 1 to 2 weeks. At this time last year, the sum of effective temperatures over +5 degrees was about 80 to 120 degrees in the republic's southern rayons. The accumulation of positive air temperatures is proceeding slowly. As of 24 April, 40 to 90 degrees had been accumulated in the major part of the republic's territory and 100-150 degrees in Brest, western Grodno and southwestern Gomel oblasts. This is 60-100 degrees below normal, 25-50 degrees in the southwest.

At the present time, the upper layer of soil is quite moist in Brest and Gomel and almost everywhere in Grodno and Minsk rayons and a number of rayons of Vitebsk oblast. The temperature of the soil at a depth of 10 centimeters is 4 to 6 degrees here and 7 to 8 degrees in the south. In the rest of the territory, the soil is still excessively wet.

Under the influence of the cold weather in most of the rayons of the northern half of the republic, winter crops are not yet growing. The buds of fruit trees are very slow to swell, this having been noted only in the southwest part of the republic.

## Warm, Wet Weather Problems

Minsk SELSKAYA GAZETA in Russian 20 May 87 p 3

[Unattributed article: "Weather and Crops"]

[Text] The last week in the territory of the republic was characterized by very unstable weather with respect to temperature. The average daily air temperature on 5 May, the coldest day, was 2 to 4 degrees below normal, whereas it was 3 to 5 degrees above normal on 14 May, the warmest day. The night of 16 May was very cold. The minimum air temperature was generally 0 to 5 degrees and in places in Vitebsk and Mogilev oblasts it was 1 degree. Light frosts to -1 degree were noted on the surface of the soil that night in individual rayons of Vitebsk, Mogilev and Minsk oblasts and in places in Gomel Oblast. Rains fell everywhere. The most intensive rains were recorded on 17 May and produced excessive moisture in the upper layer of the soil in the northeast part of the republic.

The rains that fell replenished the supply of useful moisture in the soil and improved the agricultural weather conditions for the growth and development of crops on light soils. The stems of winter crops are growing almost everywhere. The sprouting of shoots was noted for clover. Grasses are growing out. Budding and blooming of winter rape is being observed. The bushing out of barley sown in the second 10 days of April has begun in places in the southern rayons. Shoots have appeared on flax sown during the first 5 days of May. Sugar beets came up within 10 days in individual beet-growing rayons. Cherry, plum and pear trees bloomed about on time in a number of rayons in the southern part of the republic.

The moderately warm weather with brief rains will continue over the next 2 days.

In a number of rayons of the southern zone of the republic, one is observing the development and activation of damage from the beet flea and especially from the dull carrion beetle. The agronomic services of the farms must establish continuous control over the phytosanitary state of beet fields and they must immediately treat the fields with insecticides when the plantings show eight or more fleas per square meter or two or more carrion beetles.

In the southern and central rayons, it is possible that flax fleas will appear on plantings of flax with the arrival of warm weather. There must be no delay in carrying out protective measures. Border treatments of the flax fields at a width of 35 to 50 meters must be performed with insecticides when isolated insects appear and unbroken treatments of the entire area of flax plantings must be carried out when there are 20 or more fleas [per plant] and the weather is hot and dry. The crops must be sprayed with metaphos, Dipterex using 1 kg per hectare, phosphamide (BI-58) or Malathion at a rate of 0.6 to 0.8 kg per hectare.

The first plantings of flax in the republic's southern zone have already reached a height of 3 to 5 centimeters. It is therefore necessary not to lose time and to begin chemical weeding with herbicides.

## Crop Progress Detailed

Minsk SELSKAYA GAZETA in Russian 28 May 87 p 1

[Unattributed article: "Weather and Crops"]

[Text] May, the last month of spring, is coming to an end. It was basically a cool month, even very cold on individual days. Thus, the republic again cooled off beginning on 23 May. The average daily air temperature fell to 6 to 11 degrees on 26 May, being 4 to 8 degrees below normal. At night and in the morning hours of 26 May, the air mainly cooled down to 0 to 3 degrees above zero. At a height of 2 centimeters and on the surface of the soil, light frosts of 0 to -3 degrees were observed in most republic rayons.

Such weather is delaying the normal growth and development of agricultural crops. At the present time, shoots are sprouting on clover plantings. In places in the republic, heading of cereal grasses and the formation of racemes on alfalfa have begun. Heading of winter rye has been noted in a number of rayons of Brest Oblast and in the southwest of Minsk Oblast. In the rest of the territory, stem growth is continuing on the plantings. On 26 May last year, the heading phase for winter rye was observed almost everywhere. Stem growth is taking place on winter wheat. Bushing out is being observed on April barley plantings in most rayons and on oats in southeast rayons. Their stem growth has started in places in Gomel and Brest oblasts. The state of the crops is good. Potatoes planted at the end of April to the first 10 days of May have begun to sprout in a number of the republic's southern rayons. Cherry, plum and pear trees have bloomed everywhere. They have ceased blooming in a number of rayons. Apple trees have blossomed in the southern half of the republic and in places in the north. The low temperatures and gusty winds were unfavorable for the normal blooming and pollination of orchards.

The cool weather will continue during the next 2 or 3 days. Light frosts are possible in places during the morning hours.

## Grass Harvest Prospects Outlined

Minsk SELSKAYA GAZETA in Russian 4 Jun 87 p 3

[Article: "Weather and Harvesting of Grasses"]

[Text] The weather conditions this spring favored the increased bushing out of perennial grasses on the one hand and their slower growth on the other. At the present time in the republic, a shortfall of 50 to 60 degrees in effective warmth is being observed in comparison with the average over many years and this means that the passing of the development phases is being delayed by 5 to 6 days. As of 1 June, therefore, the biological yield of grasses is somewhat lower at most farms than on this same date last year.

The application of nitrogen fertilizers is very effective under this year's conditions. Where 60 or more kg per hectare were applied to mixed orchard grass, for example, the yield of mass is no lower than last year.

A rather good yield of clover is expected. Mowings of seed plantings of this crop performed the 27th and 28th of May at the Belorussian Research Institute for Agriculture showed that because of the increased bushing out and branching the yield of green mass is expected to be no lower than the level of 1986, despite the fact that its height was 7 to 10 centimeters lower than in past years. Analogous data were obtained for hybrid clover.

The time of the harvest of the first mowing was 5 to 6 days later than usual. And this means that the vegetative period for the obtaining of the second mowing will be reduced by that many days. The optimum times for the harvest of early-ripening herbage have arrived everywhere and it is time for the harvest of medium-ripening herbage in the southern part.

Proceeding from the existing situation, the importance of the timely start and rapid harvest of the herbage of the first mowing is increasing sharply. It is essential to harvest all varieties of grasses within 7 to 10 days after they become mature for harvesting.

Each farm must provide for the immediate application of no less than 40 to 45 kg of nitrogen on cereal grasses and improved hay fields after the harvest of the first mowing. It will be highly effective this year under the conditions of adequate moisture and it will be possible to obtain up to 20-25 feed units from each kilogram of nitrogen.

The application of 40 to 80 tons of liquid manure per hectare after the harvest of the first mowing will permit a significant increase in the yield of the second mowing.

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CSO: 1824/290

## WEED, PEST WARNINGS IN BELORUSSIA

## Field Work Guidelines Issued

Minsk SELSKAYA GAZETA in Russian 26 Apr 87 p 1

[Text] The development of spring processes is responsible for the delays in the field work. At the same time, one observes a striking contrast in the weather conditions and readiness of the soil in southern and northern rayons. In comparison with last year, little more than half the area of spring grain and legume crops has been sown. The situation in the fields urgently requires an increase in the pace of the work in applying fertilizers, soil preparation and sowing and in the organization of the two-shift work of equipment and around the clock for certain types. Provision must be made for the highly productive work of aircraft in applying mineral fertilizers.

## IN THE SITUATION AT HAND, IT IS ESSENTIAL:

--after the winter period, to make another close assessment of the state of winter crops and perennial grasses, especially clovers and winter rape, and to determine measures for their care in each section;

--to accelerate the work in completing the supplementary feeding of winter crops, perennial grasses, hay fields and pastures. Special attention must be paid to the feeding of the remaining fields of winter rape with nitrogen fertilizers in a dose of not less than 120 kg per hectare. The agronomic services of the farms and the forecasting system must maintain continuous observations of the development of rape and the performance of protective measures against pests and diseases on its plantings. A delay of 1 or 2 days in carrying them out can lead to the complete loss of the harvest;

--to follow carefully the course of the maturation of the soil so as not to miss the optimum time for the performance of field work. Organize the highly productive work of equipment in applying organic fertilizers during all daylight hours;

--to increase the pace of the work in dressing areas with mineral fertilizers and to carry on field work actively, making extensive use of wide-coverage and combined machine units in preparing the soil;

--In the current year, there is a significant increase in plantings of grain fodder crops with an undersowing of legumes. It is essential to consider that it is recommended that oats with an undersowing of spring vetch be weeded with prometrin in a dose of 1.2 to 1.5 kg per hectare in compound form after sowing but prior to sprouting and that barley or oats with peas be weeded during the phase of the bushing out of the grain crops and when the peas have four to five leaves with the following working mixtures: bazagran with a 48-percent water solution--2 liters per hectare with the addition of 2M-4Kh sodium salt, 70-percent r.p. (metakson) 0.3-0.4 kg per hectare; or 2M-4KhM (SIS 67 MB, tropotoks), 80-percent r.p. powder 1.6-1.9 kg per hectare along with 2M-4Kh sodium salt, 70-percent r.p.--0.3-0.4 kg per hectare.

#### Chemical Protection Measures Outlined

Minsk SELSKAYA GAZETA in Russian 23 May 87 p 1

[Unattributed article: "Attention, Farmers!"]

[Text] We are now seeing a mass infestation of the plantings of winter rape with the curculio. The signaling points have noticed a high density of the pest on the farms of Brest, Gomel, Minsk and Grodno rayons and in the southern rayons of Mogilev Oblast. With the beginning of warm weather, there was an increase in the activity of the curculio and its harmfulness is increasing. In addition, under the conditions of the high air humidity in the southern rayons of Gomel Oblast, there have been signs of plant damage from false mildew (peronosporosis). Cruciferae may appear on the sprouts of spring rape.

This is why it is necessary to carry out timely quality chemical-protection work on the rape plantings as well as unremitting daily control of the phytosanitary state of the plants.

Metafoz, fozalon and sumitsidin are used to protect the rape plantings against pests. With the first signs of false mildew, it is essential to treat twice with tsineb or polikarbotsin, 2.4 kg per hectare, with a 7-day interval between treatments.

The protective measures should be carried out in the morning or evening. A delay of even 1 day in treatment leads to a significant decline in the yield. Particular attention should be paid to the observance of the quality of the treatments and to the careful adjustment of the sprayers for optimum operation. One must make broad use of preventive treatments of the edges of the fields.

It is essential to carry out the second supplementary feeding of plantings with nitrogen fertilizers in a dose of 40 to 60 kg of active agent taking into account the state of the plants in each specific section.

## Measures Against Aphids Outlined

Minsk SELSKAYA GAZETA in Russian 24 May 87 p 3

[Article by V. Novokshonova, junior scientific worker of the Belorussian Research Institute for Plant Protection, under the "To the Attention of Farmers" rubric: "The Cereal Aphid--A Dangerous Pest"]

[Text] Cereal aphids are dangerous pests to wheat, rye, barley and oats. Their development is favored by the onset of warm and humid weather, which leads to the rapid infestation of the young crops by the insects.

The appearance of the aphids in large numbers on the leaves of cereal crops delays the growth of the plants. If the cereals are infested by aphids early (before the phase of stem growth), the plants do not form ears well, which leads to a significant reduction in the yield. If they are infested by aphids in the phase of stem growth, there is a higher percentage of empty ears, a decrease in the mass of straw and a significant worsening in the quality of the grain. It becomes shriveled and, in the case of barley and oats, it becomes more membranous.

Of the aphids permanently living on cereals, the most numerous are the common bird cherry and large cereal aphid.

The bird cherry aphid is a migrating insect. In the spring, it develops on the basic food plant, the bird cherry, and then (in the last 10 days of May) it migrates to grain crops. This year, according to forecasts, its mass migration should begin on 25 May. This aphid primarily infests spring grain crops, which by this time are in the phase of two to three leaves and bushing out. Developing on cereals, the pest chooses for infestation areas closest to the cone of growth, penetrating into the upper leaves of the funnel. It is difficult to detect it during this period. It is most often found after it has already multiplied and caused a certain amount of damage.

The large cereal aphid is a nonmigrating species. It overwinters on sprouts of winter grains. The development of the aphid depends entirely upon the weather conditions. The increase in the numbers of the insect parallels the growth and development of winter crops. The first winged specimens appear in May and their appearance usually coincides with the heading and blooming period. They become most numerous during the milk-maturity phase of winter crops.

The moderately warm and moist weather in the spring and summer period favors the intensive development of aphids. This year, there may be a good deal of damage from cereal aphids in thickly sown sections and in fields sown late. Accordingly, it is essential in the bushing-out phases or when there is a threshold number of bird cherry aphids to combine the chemical weeding with a campaign against aphids, supplementing the herbicide with methyl parathion, phosphamide, Malathion, metathion or bazudin. The criteria for the numbers of aphids beyond which it is necessary to take action are the following: in the phase of stem growth, 6 or 7 insects per stem for the common bird cherry aphid and 0.5 to 0.6 insects for the large cereal aphid; in the phase of the

formation of spikes, 70 to 95 insects per stem for the common bird cherry aphid and 1 to 2 insects in the case of the large cereal aphid; in the blooming phase, 10 to 11 insects per ear for the large cereal aphid.

#### Plant Protection, Feeding Requirements

Minsk SELSKAYA GAZETA in Russian 29 May 87 p 1

[Article by the Inspection Brigade: "Not to Allow a 'Green Fire': A SELSKAYA GAZETA Inspection and Belselkhozhimiya [Belorussian Agricultural Chemistry"; first two paragraph are SELSKAYA GAZETA introduction]

[Excerpts] Taking part in the inspection were T. Golovnya, head of the plant protection administration of Belselkhozhimiya; Ye. Kolonitskaya, chief of the republic laboratory for forecasts on agricultural plant pests and diseases; and L. Kozhanova, senior agronomist of Belselkhozhimiya.

The materials of the surprise inspection were prepared for print by V. Algerchik, special correspondent for SELSKAYA GAZETA.

According to the data of the specialists from the plant-protection stations, the density of weeds is higher this year than in past years. Many agronomists were correctly oriented on the complex situation on time. The harrowing of spring grain crops before and after sprouting was carried out on time. A surface cultivation of sugar beets and potatoes is now being carried out. The plantings are clean. They have done a good job of organizing the care of young crops in Sloninskiy, Luninetskiy, Svislochskiy, Braslavskiy, nesvizhskiy, Dyatlovskiy, and Stolbtsovskiy rayons.

In a number of other rayons, unfortunately, this work is being performed unsatisfactorily. They are unjustifiably slow in getting the machinery out into the fields and the optimum times for chemical measures are not being met. At the same time, the provision of equipment and pesticides is significantly better this year than in years past.

There have been delays in the work to weed winter crops, especially wheat, with herbicides. Coming out ahead were those farms where the plantings were treated with simazin in the fall. In May, however, the proper attention was not paid to this measure on the farms of Baranovichskiy, Ivanovskiy, Pinskiy, Verkhnedvinskuy, Postavskiy, Sharkovshchinskuy, Dzerzhinskuy and Smolevichskiy rayons, where simazin was applied only on individual farms.

The pace of the application of retardants against lodging was half of what it was last year, even though the time for treatment arrived everywhere. This work is being delayed in Gomel, Minsk and Mogilev oblasts. What such carelessness leads to is seen in the occurrence that took place in Kamenetskiy Rayon.

And on the contrary. In Svislochskiy Rayon, they prepared early for the care of crops. They were organized in carrying out the presprouting harrowing of grain crops. They are actively carrying out surface cultivation of fields of potatoes, sugar beets and root crops.

The Selkhozhimiya Rayon Association prepared a stand for the adjustment of sprayer diffusers. There they adjusted not only their own equipment but also that of kolkhozes and sovkhozes. They are using the link method to perform the work in caring for winter and spring crops. The treatment of plantings begins no later than 7 am. Provision has been made for an uninterrupted supply of water.

The care of plantings is poorly organized on the farms of Uzdenskiy and Pukhovichskiy rayons. Here up to half of the rod sprayers are idle every day because of the poor organization of the specialists of the agronomic service for the farms of rayselkhozhimiya. The workers of the plant-protection stations are not controlling the quality of the work.

One of the main conditions for obtaining the planned harvests of grain crops is the proper application of mineral fertilizers, especially nitrogen fertilizers.

As everyone knows, insufficient nitrogen in the soil leads to a significant shortfall in the grain harvest. At the same time, excess nitrogen feeding promotes excessive bushing and the growth of unproductive stems, which, in the final analysis, also leads to a reduction of the grain yield, unjustified losses of nitrogen and the contamination of the environment.

But the farms of Braginskiy, Kormyanskiy, Berezinskiy, Vileyskiy, Krupskiy, Minskiy, Nesvizhskiy, Smolevichskiy, Krasnopol'skiy and Chausskiy rayons did not perform a plant diagnosis of winter grain crops. Specialists of individual farms are applying unjustifiably high doses of nitrogen to the supplementary feeding, ignoring the results of plant diagnostics.

Thus, on the average in Vetkovskiy Rayon, according to the results of plant diagnostics on 2,000 hectares of winter grain crops, it was necessary to apply 29 kg of nitrogen per hectare. In fact, 46 kg were applied. With such an approach to the work, one cannot expect anything except a shortfall in the grain yield and environmental contamination.

The results of the plant diagnostics indicate that about 50 percent of the fields of grain crops checked do not need a second feeding. At the same time, the provision of nitrogen is very low for 15 percent of the areas. On such fields, supplementary feeding must be carried out before anything else.

What measures must be undertaken to correct the existing situation and not to allow losses in the yield?

In the first place, each farm should finish checking all crops without delay and reveal their condition, determining the specific procedures for the care of the crops in each field. In the second place, the seed plantings of winter rape in the central and northern rayons of the republic are in the budding phase and their infestation with the rape curculio has been noted. It is expected to become more damaging in the last 10 days of May. This is why all plantings of spring rape, turnip rape and oil-yielding radishes must be weeded on time with lontrel.

Time is of the essence. To carry out all chemical protection work promptly and on time means to put a solid claim on the future good harvest.

#### Special Control Measures

Minsk SELSKAYA GAZETA in Russian 30 May 87 p 1

[Unattributed article: "Attention, Farmers!"; first paragraph is SELSKAYA GAZETA introduction]

[Text] A complex situation has developed in the republic's fields, a situation that in many ways differs from past years. The situation requires the taking of special measures to protect the plantings against weeds, pests and diseases. Everything will depend upon the discipline and efficiency of specialists locally, in the Selkhozkhimiya rayon associations, and in the rayon agro-industrial associations.

The weather conditions delayed the appearance of sprouts of spring grains and interrow crops and their physiological development was uneven. Whereas the winter crops have formed spikes on the farms of Brest and Gomel oblasts and the spring crops are in the stage of bushing out, the delay in the development of the plants ranges from 7 to 12 days in the northern and central rayons.

The plantings of winter and spring grain crops are characterized by a high density. Diseases, including mildew, helminthosporiosis, false mildew and others, showed up earlier than usual. The unevenness of the application of nitrogen fertilizers, the presence of an adequate amount of moisture and the poor use of retardants led to the local lodging of winter crops on individual farms.

Unfortunately, still not all specialists of the republic's agronomic service are properly assessing the existing situation or are taking proper measures in the fight against weeds and pests. As a result, for example, more than 300 sprayers stand idle on the farms of Mogilev Oblast, 700 in Vitebsk Oblast and 400 in Minsk Oblast. And in the republic as a whole, more than 300 units of Selkhozkhimiya and 2,300 of kolkhozes and sovkhozes are not participating in the work. That is, one out of three machines is not in action in chemical treatment. As a result of organizational neglect in the republic as a whole, about 100,000 hectares are not treated with pesticides every day.

In this connection, it is essential:

--to inspect all plantings of agricultural crops immediately at each kolkhoz and sovkhoz using the forces of the agronomic services with the help of specialists from the rayon agro-industrial associations, the plant protection stations and the forecast centers. It is essential to reveal their condition and to outline specific measures for their care in each field and section. There can be no common prescription for all. It is necessary to determine precisely the volume of work to be performed by Selkhozkhimiya and the farms themselves. One must take into account the compounds available on each farm

and organize their utilization on those crops and plantings where the economic return is greatest;

--to include in the work all available equipment at kolkhozes, sovkhozes and Selkhozkhimiya associations. The chemical protection work should be performed using the link method only . It is necessary to raise the daily output to 30-40 hetares for ground equipment and to no less than 300 hectares for aircraft. The responsibility for the technical state of the equipment is placed on the engineering service;

--to establish the strictest control over the observance of the established doses of pesticides and safety procedures through the specialists of the plant protection stations and control and toxicological laboratories;

--in carrying out complex chemical-protection work, success will largely depend upon the machine operators. It is essential to establish for them all of the conditions for successful labor, to organize their transportation to and from their place of work, and to set up their meals and rest so that field operations to care for crops will begin no later than 7 am and so that aircraft are involved in the work at sunrise;

--in all rayons and farms, it is necessary to summarize the results of the inspection of the plantings with the participation of farm agronomists and specialists from the rayon agro-industrial associations, Selkhozkhimiya associations and plant protection stations and to give a practical assessment of the work of each specialist.

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## IMPACT OF INTENSIVE TECHNOLOGY ON KAZAKHSTAN GRAINCROP

## Intensive Farming Methods Urged

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 20 May 87 pp 1-2

[KazTAG item: "The Fields in Action"]

[Excerpts] As has already been reported, on 18 May in the city of Kokchetav, at a meeting of the Bureau of the KaSSR CP Central Committee with Party obkom first secretaries and chairmen of the Kokchetav, Kustanay, North Kazakhstan, Turgay and Tselinograd oblast oblispolkoms, the party, soviet and economic organs' tasks for further increasing grain and feed production were discussed along with their targets for unfailing fulfillment of the plan and their socialist obligations for 1987.

These oblasts provide 65 percent of the total grain purchased by the republic and this area raises 80 percent of its grain crops using intensive production methods.

It was emphasized at the meeting that all available forces, knowledge and experience must be used to set the stage for producing a high yield in every oblast, rayon and on every farm, without exception.

The potentialities for accomplishing this are everywhere, but they presuppose full use of all existing reserves. First of all it needs to be understood quite clearly that even a slight reduction in the amount of acreage planted entails a great deal of concern about improving farming efficiency. For example, in this year's draft plan, the Turgay Oblast's wheat planting is being reduced by 111,000 hectares compared to last year and the Tselinograd Oblast is cutting back by 39,000 hectares. The Kokchetav and Kustanay oblasts are reducing the amount of acreage planted in barley and millet, respectively.

At the same time, the appointed plan for state grain purchases is the holy of holies, and must be fulfilled. In this connection, we need to sharply increase the fecundity of every hectare, and this can be done only by actively mastering the intensive production methods which helped the republic produce about an additional 3 million t of grain last year. Now it is time to make new gains.

Thus, 5.6 million hectares will now be planted in grain crops, which will allow us to count on 3.4 million more tons in total grain yield. The republic has been allocated substantial quantities of fertilizers and pesticides to aid in this effort. The land and seed have already been prepared and the labor force has been trained. Our task lies in thoroughly analyzing last year's omissions, and allowing no new errors.

The experience gained by many labor collectives shows that large harvests can be brought in every year, even in knotty natural and climatic conditions. For example, the Zlatopolskiy Sovkhoz (Kokchetav Oblast, Shchuchinskiy Rayon) has been harvesting up to 21.6 quintals of grain per hectare for two five-year plan periods, and last year brought in 24.6 quintals per hectare. The contract brigade led by Hero of Soviet Labor Comrade S. I. Gavrilyuk, at the VNII [All-Union Scientific Research Institute] of the Grain Economy Experimental Farm, produced up to 32 quintals of grain per hectare in the last harvest. These successes are no accident. This farm has completely mastered the practice of rotating crops with up to 16-20 percent clean fallow, has introduced subsurface soil cultivation, is making effective use of mineral fertilizers and is planting new high-yield grades of spring wheat and other crops. As a result, this brigade has achieved an average annual grain harvest of 16.5 quintals per hectare for the last quarter century. And the total annual rainfall in these parts only amounts to 300-350 mm.

Last year 5.6 more quintals of spring wheat were harvested per hectare in the Kokchetav Oblast by using high farming systems, than by using ordinary methods. Yields rose to 6.5 more quintals in the Kustanay Oblast, 6.4 in the North Kazakhstan Oblast and 5.3 quintals per hectare in the Tselinograd Oblast. However, not all oblasts met the target for grain crop yields in fallow lands and sub-fallow lands [podpark], which shows that there is still some inefficient farming going on.

What kind of yield can be anticipated in light of the fact that the Tselinograd Oblast's first tilling last year only treated 16 percent of its fallow areas during the best time period, i.e., prior to 1 June?

Unfortunately a number of places are involved, as has always been the case, in extensive grain farming. Thus, certain sovkhoz managers in the Turgay Oblast have reconciled themselves to a prolonged lag and are attempting to use the drought to explain away their many miscalculations.

This situation stems from the fact that party and soviet agencies are not properly calling managers and specialists to account for failures in their work and for oversimplifying their farming practices.

Nor has the introduction of high farming methods been assimilated everywhere this year. Thus, only 30 percent of the Kokchetav Oblast's fallow ground has been fertilized since autumn, with only 25 percent in the Kustanay Oblast and 8 percent in the North Kazakhstan Oblast. And now this neglect must be quickly made up for. The Kokchetav and North Kazakhstan oblasts have little first-class seed. The equipment for applying fertilizers and soil herbicides is not ready everywhere, nor have correct uses for them been thought out.

Serious attention needs to be given to water conservation, to intensifying the struggle with wild oats and other weeds and to correct seed selection and treatment. Also, it is crucial that we keep strictly to optimal sowing times and depths.

Our task lies in sowing the spring wheat everywhere no later than 25-26 May, and sowing barley and oats before 1-5 June. We must keep to these times, and need to get busy planting those fields which have been treated with triallat.

No less than 19.8 quintals per hectare must come from the Kokchetav Oblast's "intensive fields", with 19.9 from the Kustanay Oblast's fields, 23.3 quintals per hectare from the North Kazakhstan Oblast's fields, 14.6 from those in the Turgay Oblast and 17.9 from the Tselinograd Oblast.

Without finding vigorous and long-overdue solutions to a complex of problems, it will be difficult to count on this republic's agricultural industry reaching the advanced goals outlined by the 27th CPSU Congress, or meeting the targets set in the country's Food Program. And this must be understood by every employee of the agro-industrial complex--from the rank and file to managers.

#### Intensive Farming Methods Pushed

Alma-Ata SELSKOYE KHOZYAYSTVO KAZAKHSTAN in Russian No 4, Apr 87 pp 22-23, 26-27

[Article by G. Zinger, chief agronomist, KaSSR State Agro-Industrial Committee Main Farming Administration, under the "Scientific and Technical Progress: Experience and Problems" rubric: "The Lessons of the Intensive Field"]

[Excerpts] 1. Intensive production methods are growing in importance with regard to boosting grain production. These methods were used last year on over 5.5 million hectares in this republic, and yielded an additional 3 million t of grain for us.

The intensification of grain crop cultivation, as applied to zonal soil and climatic conditions, means sowing crops in those previously-used fields which provide optimal moisture conditions (mostly clean fallow lands) and ensuring a balanced presence of soil nutrients and the use of a combination of effective anti-erosion, moisture-retaining and moisture-conserving methods. It means using new highly-productive intensive plant varieties, and an effective integrated system for protecting crops from pests, diseases and weeds. The mandatory requirement of highly intensive farming methods is that planting, harvesting, etc. times be observed precisely and that all agrotechnical and chemical operations be carried out with great emphasis on quality.

The basis for highly-productive utilization of arable lands farmed with intensive methods is rational crop rotation. The structure of the crop rotation system used in this republic takes our special soil and climatic conditions and each farm's sectorial specialization into account. In the grain-growing regions, we have found that short-term rotation of grain crops is most productive where fallow lands make up 16 to 25 percent of the crop rotation

area. In recent years, a number of improvements have been made in sound crop rotation. In early 1986 some 80 percent of our crops were being managed with sound rotation techniques, against 65 percent during the 11th Five-Year Plan period. The best crop rotation results have been achieved on Kokchetav, Kustanay and North Kazakhstan oblast farms, where they rotate 89-90 percent of their crops.

Fallow grain crop rotation greatly increases the productivity of our fields.

However, our efforts to master crop rotation as a basic intensifying factor have slackened somewhat in the East Kazakhstan, Karaganda, Semipalatinsk, Ural and a number of other oblasts. This is the only reason the grain yield in most of the sovkhozes and kolkhozes has fluctuated so drastically through the years, depending on prevalent weather conditions. Nor has scientifically substantiated rotation of crops been carried out on the requisite level on a number of farms in the northern oblasts. Lack of control on the part of the agricultural industry's agronomic services and the RAPO's [District Agro-Industrial Associations] has caused frequent disruptions in crop rotation and violations of the norms for allocating fallow fields. A great many agrotechnical measures related to taking care of these fields are not being implemented, which leads to the fields being overgrown with weeds, particularly wild oats, and leads finally to a reduced yield.

Clean fallow, windbreak fallow and fertilized fallow, in arid conditions such as ours, are all helpful in accumulating additional stores of the moisture and nutrients which form the basis for our bringing in steady grain harvests and other farming products. This is why the treating of fallow fields and improving their effectiveness must be given no less attention than, say, doing the spring planting on time, or bringing in the harvest. According to data from scientific research institutions, clean fallow contains 32-40 percent more productive moisture by the beginning of the spring planting than fields previously used for non-fallow purposes. The benefits from using fallow fields have been growing, particularly during drought years, when they contain almost 2-fold more moisture than even subsurface cultivated, late-fall plowed fields. Moreover, a factor of 1.6 less moisture is used to produce a single quintal of grain in wheat fallows than in a late-fall planted field.

Fallow fields are playing a major role in the struggle against weeds. What's more, pernicious weeds such as wild oats, creeping grasses, sedge, bindweed and sowthistle can be successfully fought only in a fallow field. Compared to sections previously planted in crops, fallow fields more actively accumulate

plant nourishment in the form of minerals. In a word, a fallow field is actually a field which is in the process of reclaiming itself, giving itself a major overhaul, all of which has a beneficial effect on the entire rotation of four- and five-plot grain fallow crops.

The fate of future harvests depends on the number of fields on a farm and their condition, on whether they are receiving needed organic and mineral fertilizers and whether the role of the "repair field" is being carried out through crop rotation. Underestimating the above, in view of Kazakhstan's droughts, usually leads to grain shortages and considerably diminishes a farm's stability.

The positive influence of fallow fields has been corroborated by the experience of a great many sovkhozes and kolkhozes. Thus, in the major grain growing regions of the North Kazakhstan, Kokchetav, Kustanay and Tselinograd oblasts, the yields of spring wheat planted in fallow fields have for years surpassed, by 4-5 quintals per hectare, the grain harvests from wheat fields which have been planted in wheat more than two years running. Moreover, the aftereffects of clean fallows are becoming apparent.

During the severe drought of 1984, Kustanay Oblast farms produced 4.5 quintals of wheat per hectare from 286,000 hectares, but harvested 8.2 quintals per hectare from their fallow fields.

Having fallow fields is only a part of the matter. They produce the required effect, provided they are cared for properly. Take the cultivation of fallow fields. We know that the first spring cultivation of fallow fields has to be done as early as possible prior to the completion of planting in order to destroy those weeds which have started up and to create conditions favorable to intensive germination of the crops planted later. However, with the advent of spring, many farms forget about their fallow fields, and don't start their first cultivation until the end of June or the beginning of July, when weeds are growing in strength and have used up a great deal of the fields' valuable moisture and nutrients.

Only about 60 percent of the fallow fields on Aktyubinsk, Kokchetav and Pavlodar oblast farms were plowed and cultivated for harvest during this year's optimal time slots, with an even lower percentage in the Tselinograd Oblast.

Recently, the republic's fallow areas have increased substantially. During the 11th Five-Year Plan period, these areas increased by 1.5 million hectares over the 10th Five-Year Plan period. Some 5.4 million hectares of fallow land have already been allotted for harvest purposes for this year.

The planting of windbreak strips in fallow areas is being practiced extensively. These strips, along with snow fences, combinetoensure an excellent snow cover.

2. The application of mineral fertilizers is an important agricultural tactic which greatly increases the yield of fallow fields. Data from the All-Union Scientific Research Institute of Grain Farming imeni A. I. Barayev and from experimental stations in the northeast part of the republic show that the greatest effect is derived from applying phosphorous fertilizers to fallow fields under four- and five-plot grain-fallow crop rotation. Recommendations call for 60-80 kg of active phosphorous agent to be applied per hectare. These doses increase the spring wheat yield by 2.5-3.5 quintals per hectare during the first year of their action, and considering the residual effect of the increase, this comes to an increase of 8-10 quintals per hectare.

Agronomists are aware that a basic dose of artificial fertilizers produces the greatest benefit through local intra-soil application with a continuous screen, or in strips, with distances of no more than 15 centimeters between

strips. This is done using Szs-2.1 or Szs-2.1L fertilizer drills, or GUN-4 deep-ripper fertilizer applicators, which operate at depths of 12-16 centimeters. However, individual farms in the Kokchetav and Tselinograd oblasts often apply mineral fertilizers to their fallow fields by broadcasting them onto the surface. This sharply diminishes the effectiveness of the mineral fertilizers.

At the VNIIZh [All-Union Scientific Research Institute of Grain Farming imeni A. I. Barayev], where Szs-2.1L fertilizer drills were used to apply 80 kg of active phosphorus material, they obtained an additional yield of 2.6 quintals of grain per hectare, with only 0.8 quintals per hectare gained by using the broadcast application method.

The importance of seed strains is increasing vis-a-vis intensifying grain production. The grain crop varieties used in high-agriculture sowing must be regionized types which are responsive to rich soil, have good standing power, are pest and disease resistant and which meet the requirements made on strong and durum wheat varieties. The Saratov 29 spring wheat variety is the most widely planted variety in our republic, and is also the variety most widely sown in our main wheat growing regions. It possesses a high degree of plasticity and outstanding baking qualities. However it tends to fall and is susceptible to disease, which lead to grain shortages and reduced grain quality, particularly in years when moisture levels are favorable, and in rich soil regions.

The planting of intensive-method fields necessitates the use of the Omsk 9, Irtyshsk 10, Zhigulevsk and Tselina 21 regionized soft spring wheat varieties, the Altayka, Almaz and Bezenchukskaya 139 durum wheat varieties and the Saratov 3 millet variety. These strains ensure the greatest added yield when sown in rich soils.

I wish to direct a reproach at our selection scientists: the Kazakhstan wheat varieties have presently been selected for use in only 7 percent of the area sown in this crop.

The paramount requirement for improving the effectiveness of high-yield agricultural methods consists in comprehensively protecting the harvest from pests, diseases and weeds. This protection proceeds from a combination of agrotechnical and chemical measures. In 1986, to combat wild oats, the republic applied the highly effective herbicides triallat, avadeks, suffiks and illoksan over a 1,423 hectare area, which is much greater than for 1985. Where the procedures for applying the herbicides were strictly observed, the herbicides were found to be 97 percent biologically effective.

During the wheat's growing season, a portion of the planted area was sprayed with illoksan and suffiks to destroy the wild oats and bristlegrass. These applications destroyed 90-95 percent of these weeds and increased the wheat yield by 2-3 quintals per hectare.

Last year's weather fostered the development of such plant diseases as brown rust, septoria spot, helminthosporiosis and others. These diseases affected up to 15-20 percent of the fields in many regions of the northern oblasts. A complex of chemical treatments greatly reduced the loss in yield.

The human factor takes on great importance when implementing intensive grain crop cultivating methods. The experience gained by the republic's leading collective shows that only those trained, skilled machine operators and specialists who have a perfect command of all the subtleties involved in raising crops according to these new methods can ensure the highest yield from every intensive hectare. During the autumn and winter of last year, over 66,000 machinery operators, managers and agricultural specialists throughout the republic were trained in the special features of using intensive farming methods. They were all certified.

Progressive forms of labor organization and wages have been further developed. In 1986, some 14,828 crop production subdivisions out of a total of 19,367 were working under collective contracts. These subdivisions take care of 27.6 million hectares of land and over 18 million hectares of grain crops.

Some 5,311 brigades and teams were employed in the use of intensive methods to produce grain crops, and 5,173 of them worked on contracts. These collectives farm 5,321,000 hectares, or 95 percent of the intensive fields.

Many of the collectives working on the collective contract produce excellent results in grain production every year. These collectives include Brigade No 2, headed by Afanasyev Vladimir Yegorovich, an experienced machine operator, which brigade works on the Kalininskiy Sovkhoz, Kustanay Oblast. This brigade has been doing contract work since 1983. The brigade has 9 members, and farms 3,651 hectares of land and two grain fallow rotation crops. Last year the collective brought in 20 quintals of grain per hectare, almost 7 quintals higher than the sovkhoz average. Each member of the brigade produced R54,300 in output, whereas the farm average is R18,000.

This skillful combination of intensive agricultural methods and collective forms of labor organization and wages allows us to use our material resources more efficiently and to achieve high yields from every hectare of land.

The advisability of using intensive farming methods is obvious. Within the republic, an average of 15.5 quintals of grain have been brought in from spring wheat plantings farmed by these progressive methods. Some 16.7 quintals were produced from each of 2,614 hectares put in clean fallow. This area yielded 5.5 quintals per hectare more than the fields farmed by the usual methods. The prime production cost per single quintal of wheat farmed by intensive agricultural methods came to R8, 7 kopecks, where the production cost of the regular methods came to R9, 99 kopecks.

The Kustanay Oblast's sovkhozes and kolkhozes brought in 17.7 quintals of spring wheat from each of the 1,150 hectares under the intensive farming system and 19.7 quintals from each hectare of the fallow fields.

Many rayons, farms and production subdivisions have produced high yields from their intensive fields, so this high farming system was used to plant 41,000 hectares in spring wheat in the North Kazakhstan Oblast's Timiryazevskiy Rayon. Each hectare produced 23.7 quintals, and this includes 19,000 hectares of fallow which produced 26.2 quintals per hectare. Thus 9.7 more quintals per hectare were produced this way than by the regular planting method.

A satisfactory rice crop was grown in a year in which the available water supply was unfavorable. Some 50 quintals of rice were brought in from each hectare of intensively farmed check plots throughout the republic.

### 3. The year's results attest to the tremendous potentialities of intensive farming methods.

However, there are serious shortcomings related to the use of intensive farming methods which greatly reduce their effectiveness. The yield of spring wheat planted using these intensive methods on Aktyubinsk Oblast farms is lower by 5.1 quintals per hectare than targeted, and by 4 quintals per hectare in the Turgay Oblast.

The yield from the fallow fields in a number of sovkhozes and kolkhozes is low. In the Chimkent Oblast, intensively farmed corn fields produced only about 30 quintals per hectare, far lower than the target. Nor were the millet and rice yields as high as planned.

The cause of this lag lies in the fact that the farms often flagrantly violate the procedure for applying mineral fertilizers and the agents used for protection against weeds, diseases and pests, and they also fail to set their soil-tilling implements correctly, which leads to defective operation.

Last year, many of them failed to sow all the intensive areas in high-grade seed. And the Sovkhoz imeni Karl Marx and the Krasnyy Partisan Kolkhoz in the Aktyubinsk Oblast, and the imeni Ostrovskiy and Entuziast sovkhozes in the Turgay Oblast failed to plant a single kg of first-class wheat seed in intensive fields.

Only precise compliance with agrotechnical demands and strict observation of technological discipline will help to produce planned yields from introducing intensive farming methods, and even minor violations will lead unavoidably to reduced harvests.

All the elements of active grain farming must be interconnected and must be carried out at the most favorable times and with high quality.

Unfortunately, when introducing new production methods, field husbandry workers have run into certain difficulties which are beyond their control. There are shortages, for example, of special machinery used for cleaning, loading and applying mineral fertilizers, and the machinery used to apply herbicides against wild oats. These implements, manufactured for the most part by skilled farm craftsmen, are far from perfect, break down frequently and are inefficient. When using the boom-sprayers which are built based on a shallow plow or the BIG-3 harrow, it is impossible to apply the anti-wild oat

herbicides into the soil evenly. And this certainly reduces their effectiveness. Perfected, highly productive machines are needed here to apply the soil herbicides while simultaneously covering them in.

Up to now, the farms have experienced shortages of mineral fertilizers. This is the sole reason all the fallow fields which were to have been planted in grains by intensive methods did not receive a full mineral fertilizer treatment in 1987.

The republic presently plans to plant 5,630,000 hectares in grain crops using intensive agricultural methods. Of this total area, 5,048,000 hectares are to be planted in spring wheat, 150,000 hectares in grain corn, 112,000 in rice, 200,000 hectares in millet, 50,000 in polygonum and 70,000 hectares in winter wheat. Full allocations of mineral fertilizers, as well as a certain amount of herbicides and other chemical plant protection agents are being allocated to the farms for this total area, and deliveries of special agricultural machinery are also forthcoming.

During the winter, thousands of machine operators, brigade and team leaders, specialists and farm managers were given training in how to apply intensive farming methods, were granted certificates and were authorized to use these advanced methods in the fields.

The comprehensive solution to all the problems associated with the introduction of intensive, farming methods will help enhance the stability of the grain economy.

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## USSR COUNCIL OF MINISTERS DEPUTY CHAIRMAN ON TIMBER EXPORT

Moscow SOVETSKAYA ROSSIYA in Russian 21 May 87 p 2

[Interview with V. K. Gusev, Deputy Chairman of USSR Council of Ministers:  
"The Russian Forest has a New Word to say on the Foreign Market"]

[Text] As is known, our main exports to many economically developed countries are raw materials: petroleum, gas, and also timber. One could say this latter is the traditional and oldest export item. However, what was once considered natural is now causing concern from the perspectives of ecology and the interests of the national economy. Large forest areas in the Far East, Siberia and even in the European part of the country are being cut to sell abroad. Understandably, the country needs foreign exchange, but sometimes our readers ask if this isn't wasteful.

In spite of all the importance of active trade-economic relations and the need to earn foreign exchange, the government very thoroughly weighs all factors in using the country's timber resources. Forests are above all a very important part of nature, determining people's living conditions. Only after this are they a raw material source. It is just this position that is the basis for each decision made by the USSR Council of Ministers.

Export potentials are determined by the total logging volumes. Here we have the leading position in the world. We sell about 10 percent of output from USSR Minlesbumprom [Ministry of Timber, Pulp and Paper and Wood Processing Industry] enterprises. Export deliveries of many types of products have not increased since the end of the seventies, while exports of cardboard and wood fiberboard have actually declined. At the same time we had to increase the imports of some forest products and paper items.

Wastefulness, if one can use that word, does not involve how much one sells, but what one sells. It is mainly raw materials: round wood, chips and lumber. Products from the chemical processing of wood make up less than a third, although they are the most profitable. If it is processed into cellulose, panels, paper or cardboard, each cubic meter of wood can earn 2-2.5 times more foreign exchange. Many Minlesbumprom products are insufficiently competitive on the world market. Neither does the sector satisfy the needs of the national economy or the public. Per capita paper and cardboard consumption in the USSR is 36 kilograms, while in the developed capitalist countries it is

more than 100 kg. Due to cardboard shortages, every year 23 million cubic meters of wood are used for packing goods. The replacement of wood packaging by cardboard would save a billion rubles in packaging cost, transport costs and spoilage.

However, in criticizing the sector's workers for the lagging production structure and low technical standards, we will keep in mind that the USSR's wood processing industry only started developing in the 1960's. It was not among those given high priority. In recent years there has even been a reduction in capital investments in the thorough chemical and mechanical processing of wood. Wear on the active component of fixed capital for the entire sector considerably exceeds its modernization. The machinery stock requires major repair or replacement.

[Question] Vladimir Kuzmich, obviously with such production potentials it will not be easy to compete. Firms in Finland, Sweden, Canada and some other countries have long been very influential and have modern technology. Moreover, we still have to purchase cellulose, paper, furniture and wallpaper from them. What measures are being taken to expand Soviet forest exports?

[Answer] The country's forest industry complex is capable of not only completely meeting the needs of the national economy, but to also be a stable long term source of exports. In contrast to other natural resources -- petroleum, gas, ores -- forests are renewable. Stands in the USSR are large -- one fourth of all the world's wood. More than half is mature or overmature. Keeping such stands in mind, we state that there is a potential to expand exports and then to meet a broader goal: being a significant supplier of foreign market demand.

A solution involves fundamental reconstruction of the wood processing industry. Such a program is being elaborated. It foresees increases in the production of finished products which meet world quality standards, making it possible to change export structure. In the next 10 years it is intended to considerably increase growth in the production of the basic types of forest and paper products, primarily those from the chemical and chemical-mechanical processing of wood. By 1995 woodboard and cardboard production should be increased 1.5-2 fold and veneer and paper production more than 3 fold. The general task is: during the 13th and 14th Five-Year Plans assure a 2-4 fold increase in the degree to which the country's paper and cardboard requirements are met. This will simultaneously mean expansion in export potentials.

Scientific research and production collectives in Minlesbumprom are to really strain their efforts. There is one path. To efficiently use available fixed capital, getting higher returns from it and, at the same time, rapidly carry out the radical reconstruction of enterprises, specializing various obsolete production operations in high quality low tonnage output. Preference should be given to subsectors engaged in the chemical processing of wood, the production of cellulose and various consumer goods, including paper of all types, furniture, millwork and factory built homes.

This extensive program cannot be implemented only through the reconstruction of existing operations. It is therefore planned to create new capacity, in

particular a cellulose plant and cellulose-paper combine in Krasnoyarsk Kray and two cellulose-paper combines in Tomsk Oblast. These will be modern enterprises in the full sense of the word. Under this concept I include the standards for solutions to ecological problems. All of us have learned much from the bitter lessons of Baykal.

[Question] Doesn't this mean a sharp increase in logging?

[Answer] Strictly speaking, that is not a precise way to pose the question. One cannot examine logging by itself. It is part of a single forest industry complex. To make this more comprehensible, let us do some comparisons. While logging the same volumes as the United States, we only produce one-sixth as much paper and cardboard and only one-eighth as much veneer. The output of finished products is very low. Therefore, it is intended to put top priority upon measures assuring considerable increases in forest resource use. We are moving towards creating comprehensive tree farms where the return per hectare of forest will be considerably higher than at ordinary tree farms.

The sector has taken a course to more completely use raw materials, including low grade wood and production wastes. During two five year plans the amount of wood wastes used in processing should increase by 20 million cubic meters, while the use of broad leaved species will increase by 30 million cubic meters. It was recommended that Minlesbumprom design and build optimal size capacity near raw material sources and in the future use them as the basis for comprehensive enterprises with permanent, renewable forest resource bases.

[Question] The restructuring of exports entails the restructuring of the entire sector and touches upon other components in the national economy. These goals can be attained only with the newest technology. What problems arise in this regard and how can they be solved?

[Answer] Scientific research and planning-design organizations are developing a system of machinery and equipment which will make possible the comprehensive, waste free and ecologically safe processing of raw materials. However, it should be admitted that machinery builders are still not ready to meet the sector's increasing demands. It is still to a great extent equipped with foreign technology. It is proposed to form a design-production machine building association in Minlesbumprom. It would undertake the creation of equipment for the comprehensive chemical and mechanical processing of wood and other equipment to produce items meeting world standards. It is an interesting proposal, but it has to be given thought.

World wide experience is evidence that the extensive use of progressive chemicals is the most important condition for producing high quality products, improving the efficiency of processes, especially for producing furniture, cellulose, paper and cardboard. Therefore, our chemical workers will be entrusted with organizing the production of various special additives for intensifying wood cooking and bleaching, cellulose formation and drying, processing waste paper and other processes.

Extensive cooperation with CEMA countries and foreign partners from capitalist countries should help in implementing the program for expanding forest product

exports. There are provisions for various forms of such cooperation -- direct ties and joint enterprises. We are confident that our partners are equally interested in cooperation, as according to forecasts, demand for forest products will continue to be high.

Organizations and enterprises in USSR Minlesbumprom are participating in six international associations and organizations with CEMA countries and have direct production and scientific ties with these countries. Contacts with Yugoslavia and North Korea are developing steadily. The Soviet-Bulgarian logging enterprise, working in the the northern European part of the USSR for almost two decades, is an example of successful long term collaboration. The Mezenles Association is now capable of hauling more than 3 million cubic meters of timber annually. In all respects this is a modern smoothly operating enterprise. Asphalt roads and well equipped lower landings have been built here. The social sphere is developing harmoniously. Workers at forest settlements live in well equipped houses with the necessary conveniences and cultural services. It is proposed to create a single joint enterprises based upon self-financing and sustained yield use.

Contracts on cooperation in the production of hydraulic manipulators and lines for packing furniture parts have been signed with firms from the FRG and Finland. Proposals for setting up 23 joint enterprises are being examined at the present time. Firms from Japan, Finland, Austria and Canada have expressed an interest in participating in them. Recently a proposal was concluded for a joint Soviet-Japanese enterprise to annually produce 90,000 cubic meters of lumber at Novaya Igirma. Such collaboration has significance beyond economics. We are overcoming well known political barriers and getting to know one another better. Broad and strong trade and production ties create and strengthen trust in the world.

I would like to add something to what has been said here. The task at hand is very difficult. It requires additional investments, new equipment and techniques. However, in the final account everything will depend upon the energy and talent of the two and a half million people working at enterprises and scientific institutions in the sector. So far not everything that should be done has been done for them. There is not enough housing. Not all loggers' settlements have schools, clubs and the minimal social services and none of them can be reached by good roads. It is time to make comprehensive decisions to urgent problems in social development and simultaneously introduce a new management system for the sector, based upon the territorial principle and with two-three levels. Starting next year enterprises in the timber, pulp and paper and wood processing industry will be converted to full cost accounting. This creates the possibility of obtaining greater material and social returns from more labor, including from selling goods the external market.

The deep and broad transformations taking place in the country will increasingly touch upon its forest industry complex. We are convinced that the intended program will help the sector move into the world's front ranks.

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## FUEL ECONOMY METHODS PROPOSED

Moscow ELEKTRICHESKIYE STANTSII in Russian No 4, Apr 87 pp 22-25

[Article by V. Ya. Peysakhovich, candidate of technical sciences, and Ye. A. Pershikova, engineer, Energosetproekt - VNIITEP (All-Union State Planning, Surveying and Scientific Research Institute of Power Systems and Electric Power Networks of the All-Union Scientific Research Institute for Integrated Fuel and Energy Problems) of USSR Gosplan: "Approaches to the Rational Utilization of Gas and Mazut Fuel in the USSR's Unified Power System"]

[Text] One of the most important approaches to improving the efficiency of developing the USSR's Unified Power System (YeES) is economizing and rationally utilizing fuel and energy resources (TER). The long-term trends in the formation of the country's fuel and energy complex -- growth in demand for power and the fundamental limit to resources of organic fuel and principally to high-quality types of it (oil and gas), which are becoming substantially more costly to recover -- make it necessary to develop and implement a broad program to improve the efficiency of utilizing TER for electric power [1].

The program for the rational utilization and economizing of TER will be pursued in the future along the following main avenues:

    rationalizing the structure of generating plants and the operating conditions of equipment;

    improving the structure of fuel utilization by reducing the use of high-quality types of fuel, mainly of mazut and later on of gas;

    technical reequipping by improving the structure of generating plants, and continually improving new, modernizing existing, and retiring obsolete equipment;

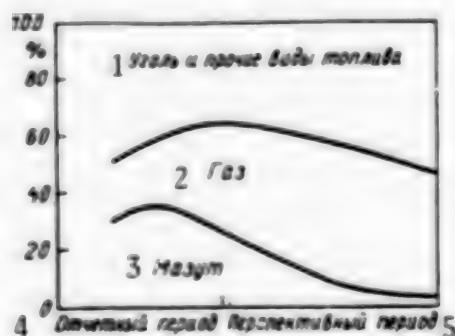
    developing nuclear power and hydroelectric power as well as new nontraditional sources of energy;

    further development of centralized heating supply and district heating; and reducing losses in the transmission of electric and thermal energy.

This article will examine the first two approaches in greater detail.

Up to the present time the structure of the fuel balance of thermal power plants has been dominated by the proportion of high-quality types of fuel (of natural gas and mazut), which increased from approximately one-half in 1970 to nearly two-thirds in 1985. This dynamic was due to the overall developmental trend in the country's TEK [fuel and energy complex] in this period, when the increased output of energy resources was secured primarily by oil and gas [2]. For an extended period of time the amount of mazut utilized by power plants exceeded the consumption of gas. At the onset of the 80s, however, this ratio was altered, and in 1985 the proportion of mazut utilized at TES had dropped by 10 percent relative to 1980, while at the same time gas consumed increased by more than 15 percent. The change in the structure of the organic fuel utilized at TES is related to the stabilization of the amount of oil recovery over the long term from the accelerated increase in the intensity of refining it in order to cover the growing demand of the country's national economy for light and special-purpose petroleum products. These prospects for the development of the country's oil-supply system will inevitably lead to a sharp reduction in the amount of industrial mazut as a boiler and furnace fuel, and most of all in the thermal power plants of USSR Minenergo [Ministry of Power and Electrification].

The development of major gas fields and the creation in the late 70s of plants to produce large-diameter pipe made it possible to considerably increase the amount of natural gas utilized. The intensive involvement of natural gas that has gone on over the past several years to cover the fuel requirements of thermal power plants (especially in the European part of the country) was primarily intended as a replacement for industrial mazut. In a number of cases, however, the use of petroleum fuel was not reduced, but that of coal was, which is impermissible. In the foreseeable future the amount of natural gas utilized in thermal power plants is expected to be stabilized, and then to decrease somewhat. The observed trends are shown in the graph, which was drawn up from studies of VNIIKTEP of USSR Gosplan.



#### Structure of Organic Fuel Use by the Country's Thermal Power Plants

##### Key:

1. Coal and other types of fuel
2. Gas
3. Mazut
4. Reporting period
5. Future period

Thus, there will be virtually no increase in resources of natural gas for new power plants. The support of new power plants under approved projects in areas where there are already surplus sources of the electric power supply (mainly the Western Siberia oil and gas area and Central Asia) and the second stage of the USSR's Energy Program will require additional large amounts of gas.

Consequently, for the foreseeable future one of the basic concepts for the development of the country's electric power system is to restrict the introduction of new generating plants that use gas as their principal fuel and to regard the construction of new plants of this kind as the exception. The implementation of this concept calls for the development during the 12th Five-Year Plan of a broad program of economizing on gas and mazut fuel at existing power plants.

When the first stage of the Energy Program is completed the proportion of industrial mazut in the total consumption of energy resources by power plants will be reduced by more than one-half relative to 1980. To ensure this pace a whole array of measures has been provided that will require both structural changes of generating plants in the power industry and improvement in the fuel supply to power plants that use organic types of fuel.

The following measures relate to change in the structure and systems of utilizing generating plants in the power industry: increase in the proportion of nuclear power sources to cover the demand for electric power and heat; conversion of power plants that burn high-quality types of fuel (gas and mazut) to a flexible operating system; modernization and technical reequipping of existing power plants to improve their technical-economic indicators; expanding the sphere of use of renewable and secondary energy sources; replacing types of organic fuel in short supply with other less effective types by introducing stored-energy systems into the structure of generating plants. The planned rate for the introduction of AES in the European part of the country will make it possible not only to cover the increased generation of electric power and heat, but also to replace obsolete plants, part of which use mazut. Because of the low efficiency of this equipment its liquidation will make it possible to reduce the unit consumption of fuel to produce electric power by an average of 1-1.5 g/(kWh) for the country.

The main approach that will reduce the level of using industrial mazut at the power plants of USSR Minenergo is to undertake measures to reduce the consumption of mazut at coal-burning power plants that use it as a technological fuel to fire up boilers and start up generator units and as a reserve fuel during operating anomalies in the plants' equipment. Considerable reserves in savings of it can be achieved by increasing the quality of coal delivered, cutting down on deliveries of non-plan grades of coal and burning mixtures of several grades of coal, and maintaining coal-delivery schedules, and also by choosing a more rational operating system for equipment.

It is planned to free up the most substantial amounts of mazut, especially in the near future, by replacing it with gas at TES. Although this measure is

even attainable at present, it requires considerable national economic costs for the recovery and transport of additional amounts of gas. The long-term scale of this substitution is determined in the process of developing and optimizing the country's fuel and energy balance (TEB). For the major consumers, such as USSR Minenergo, the operating fuel and type of fuel used are also determined, and this includes a listing of thermal power plants where it is planned to substitute gas for mazut.

In accordance with the Standard Methodology for Determining the Economic Effectiveness of Investment these power plants should be selected in the process of optimizing the country's TEB, given the structure of generating plants, on the basis of a comparison of total costs incurred to generate heat and electric power by using the values for the long-run marginal costs [zamykayushchiye zatraty] for fuel for various fuel-supply alternatives for power plants.

However, practice has shown that in the process of future and long-term planning there occurs a periodic updating and adjustment of an earlier established fuel and energy balance in the light of changing conditions in the development of the national economy. With changes in the amounts of industrial mazut and gas used in the balance of boiler and furnace fuel the necessity arises of redistributing the amounts of them both among various categories of consumers and among specific major consumers. Fluctuations in the level of fuel utilization show up mainly in consumption by USSR Minenergo's power plants. Change in the sequence of substituting gas for mazut is currently determined on the basis of expert evaluations proceeding from the distance of the consumers from the gas transport system.

To improve the soundness of the decisions reached a complete economic evaluation is needed, which will make it possible with sufficiency accuracy at the level of pre-plan studies (in the absence of detailed technical-economic computations) to evaluate the comparative national economic effectiveness of changing the fuel-supply system of specific power plants and the sequence for converting them from mazut to gas.

For this a factor analysis was made of the change in economic effectiveness from substituting gas for mazut at thermal power plants. The computations were made on the basis of existing standardizing materials and on the cost indicators (actual and prospective) for USSR Minenergo TES converted to gas in the period 1983-1990.

The effect of substituting gas for mazut was computed in conformity with the requirements of the standard methodology for the difference in total costs incurred for the generation of electric power after applying the alternatives for a comparable type as the unit of identity of the amount of output generated. The indicators of effectiveness were defined both with the fuel component and without it. These indicators were defined and analyzed in two

versions: the traditional one that provides for computation by items of cost that relate to USSR Minenergo, and an adjusted one, which also considers the costs of USSR Mingazprom [Ministry of the Gas Industry] for the gas outlet from the main gas pipeline to the GRS [gas-distributing station]. Furthermore, in this version the USSR Minenergo costs traditionally defined as the costs of converting a TES from mazut to gas are divided, for purposes of showing the correlation between the factors, into costs for gas outlet from the GRS to the GRP [gas-distribution point] and from the GRP to the main unit, and the direct costs of reequipping the TES, including costs for the main structure and the boiler house.

Analysis of the results obtained has shown that the most complete and objectively comparable effectiveness of fuel utilization is reflected by the indicator of effectiveness  $\vartheta$ , computed by the second version. In general form it can be defined by the following expression:

$$\vartheta = \Delta u - k - c + \alpha s_m - s_r,$$

where  $\vartheta$  is the indicator of effectiveness in rubles per ton;  $\Delta u$  is the difference in operating costs for a power plant operating on mazut and gas per unit of natural gas delivered;  $k$  is the unit costs incurred in reequipping a TES and equalizing the versions for capacity;  $c$  is the unit costs incurred for gas outlet from the main gas pipeline to the TES;  $s_r$ ,  $s_m$  are the long-run marginal costs for gas and mazut, respectively; and  $\alpha$  is a coefficient that reflects the change in unit consumption of fuel when converting a TES from mazut to gas. Its magnitude is on the order of 1.02, i.e., this coefficient varies in magnitude within the limits of computing error and consequently in this case the magnitude  $\alpha s_m$  can be considered equal to  $s_m$ .

Study of the components of the effectiveness of converting the TES of USSR Minenergo from mazut to gas without allowance for the fuel component has shown that the effect of these factors as a change of unit fuel consumption, operating costs, and unit investment, with the required adjustment of difference in capacity, as well as the unit costs of directly reequipping the main structure and the boiler house do not fluctuate for different TES, and as a rule do not exceed 5-10 percent of unit costs incurred for gas outlet to power plants converted from mazut to gas. In future, in connection with the conversion of more remote consumers, the share of these components will further decline.

The indicator of the effectiveness of conversion without allowance for the fuel component of costs has a negative value, although it varies in absolute magnitude. Allowing for the fuel component by utilizing the long-range marginal costs for fuel also leads in the overwhelming majority of cases to a shift to the positive in the evaluation of the effectiveness of the conversion.

The analysis of a series of computations performed by this method has shown that there is a greater impact on the comparative effectiveness of converting power plants from mazut to gas from the correlation of units costs incurred by

the delivery of gas from the main gas pipelines to TES (c) and the differences in the long-range marginal costs for mazut and gas ( $s_m - s_g$ ). For example, this correlation is more favorable, and therefore the effectiveness of conversion is greater, for the Center than for the Northwest European part of the country, since for equal magnitudes of difference in long-range marginal costs for mazut and gas, unit costs incurred for gas supply are generally lower for Center consumers, because of the more highly branched gas transport network. For the Komi ASSR, however, despite high investment in gas outlet (for the Pechora GRES, for example) and correspondingly higher unit costs incurred for the gas supply of TES than in the Central area, the indicator of the effectiveness of conversion, as compared with similar power plants in the Center, are twice as high because of the considerable excess of the indicator  $s_m - s_g$  in the Komi ASSR, due to lower costs for gas than in the Center.

Study of the fuel-supply trends of power plants shows that the proportion of these items in the total number of the components of effectiveness will increase in the future. This is related both to the dynamics of the change in the long-range marginal costs of mazut and gas and to the decrease in unit amounts of gas delivery as the distance of transporting it increases.

The ease of definition and its sufficient accuracy for the intended purposes make it possible to utilize these two dominating indicators in prospective and long-term planning to rank power plants for conversion from mazut to gas on the base of computation of the comparative economic effectiveness of mazut and gas utilization by various thermal power plants.

Apart from these economic aspects, the substitution of gas for mazut at TES, by altering the developed structure of fuel consumption by this category of consumers in the direction of a sharp increase in the proportion of gas, will create a number of serious problems, one of which is the problem caused by irregularities in fuel consumption. This is related first of all to the fact that mazut has for many years served the function of a reserve and peak fuel, and with a decrease in the level of its production there will need to be an increase in the number of storage tanks for mazut and a considerable increase in the gas distribution network because of the outsize reduction in the utilization of mazut as the main fuel. Secondly, the increase in the amount of gas burned by TES rules out its traditional utilization for damping consumers, i.e., for consumers who utilize gas surpluses in summer and reduce the consumption of it in winter. Furthermore, the practice of recent years has shown that the intensified conversion of USSR Minenergo TES from mazut to gas, because the irregularities in the curves of fuel consumption by power plants coincide with those of other categories of consumers, causes an increase of irregularities in the gas supply and rapid growth of additional demand on underground gas storage tanks (PKhG). Thirdly, the planned scale of dismantling power equipment assumes the retirement of small-capacity obsolete units that utilize industrial mazut and that have covered peak and semi-peak zones of the load curve. It is proposed to accomplish this retirement of plants by introducing special maneuverable equipment, a considerable part of which in

the near future will utilize natural gas as fuel, but the delivery of gas under this system is economically not very rational.

The conversion from a base to a peak mode makes it possible to sharply reduce the amount of gas consumed by power plants but it also degrades the indicators of the utilization of plants and equipment, both for TES directly and for gas outlets (capital-output declines, capital intensiveness increases, etc.) and it also necessitates considerable national costs, related to additional gas storage. In certain cases industrial mazut in amounts provided by the fuel and energy balance may be used as fuel for highly maneuverable equipment in wintertime. Given what has been presented, the problem of gas supply for equipment operating in a peak mode is a technical-economic problem and requires further study.

#### Conclusions.

1. The outlook for the development of the fuel and energy complex is characterized by intensive development of the extraction sectors and a sharp increase in costs for the recovery and transport of organic types of fuel, and it presupposes a considerable reduction in the ratio of high-quality types of them to generate power and heat, which will be achieved by measures to economize on them as well as from the coverage of increased demand for energy resources by nuclear power and nontraditional energy sources.
2. Stabilization of oil-recovery levels while requirements are growing for light and special-purpose petroleum products will lead to a rapid decline in the utilization of industrial mazut at the power plants of USSR Minenergo. It will also be redistributed by avenues of use. The accelerated decline in the use of industrial mazut as the main fuel for TES is accompanied by an increase in the ratio of its use as a peak and seasonal fuel.
3. Reduction in the amounts of mazut utilized at TES, especially in the short run, is proceeding by way of intensive involvement of natural gas. The proposed method of evaluating the comparative effectiveness of converting power plants from mazut to gas will make it possible to improve the soundness of decisions made to redistribute the types of fuel used by power plants.
4. Stabilizing the recovery of natural gas at the level of 1990-1995 will inevitably lead to a reduction of the reserves of it for the needs of the power industry. The use of natural gas in the semi-peak portion of the load curve, together with the availability of underground gas storage tanks, will make it possible to increase the effectiveness of using gas throughout the national economy as a whole.

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**KAZAKH COAL INDUSTRY URGED TO EXPAND PRODUCTION**

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 4, Apr 87 pp 3-7

[Article by K. Bekzatov, deputy department chief, KaSSR Gosplan Chemical and Fuel Industry: "Kazakhstan's Coal Industry in the 12th Five-Year Plan Period"]

[Text] The implementation of our country's Power Program primarily entails the radical reconstruction of our fuel and energy complex. The Program particularly emphasizes the use of energy-conserving production practices and the substitution of coal for liquid fuels. The successful development of the fuel-energy complex is one of the tasks which touches every area of the national economy. There is not a single sector whose effective operation is not directly dependent on how it is supplied with fuel and energy.

The experience of recent years has shown that the age of cheap energy is over. Easily accessible oil and gas fields are nearing depletion and the growth in their explored reserves is not keeping pace with increasing demands. It is no accident that we pin our hopes for future growth in power production on coal. In fact, of the 12.5 trillion t of standard fuel found below the surface, 11 trillion are coal. In fact, the dynamics of world coal extraction for the preceding five-year plan period shape up this way: 1980--3.5 billion t, with 4.2 billion t in 1985. All predictions say that this figure will reach 6-7 billion t by the end of this century and this includes about 1 billion t in our country (where 726.4 million t were mined in 1985).

Kazakhstan has a number of coal basins which play an important role in meeting the country's national economic needs. The Karaganda Basin supplies most of the caking coals used in coking.

This local coal basin is the hub of the Ekibastuz Fuel-Energy Complex (ETEK). Moreover, it supplies fuel to a number of other thermal electric power stations outside the republic. Coal is being mined in the Kuuchekinskiy and Borlinskiy fields. Development work has begun on the Priozernyy Field, in the Turgay Lignite Basin (Kustanay Oblast).

Also, KaSSR Mintsvetmet [Ministry of Non-Ferrous Metallurgy] is mining a little coal in the Shoptykolskiy and Alakolskiy fields for its own needs. Development has begun in the Shubarkolskiy Field where, along with stripping work, coal is being mined for local and municipal needs.

During the 11th Five-Year Plan period, coal mining volumes increased by 15.4 million t, reaching 130.8 million t in 1985. Kazakhstan's share of the total amount of coal mined in the country grew from 16.1 to 18 percent.

The republic has put enough capacities to mine 11.8 million t of coal per year into operation, including reconstruction, retooling, and organizational and technical measures.

In accordance with the plans for developing this sector, mechanized breakage complexes equipped with hydraulically-emplaced mobile supports are being introduced in the mines along with tunneling combines in the preparation workings.

At present, mechanization of breakage operations is practically complete: 98.4 percent of the coal is mined at comprehensively mechanized breakage faces. Here, the workload per breakage face has increased from 809 t to 841 t per day. More coal and rock are being loaded mechanically at preparatory workings.

The Ekibastuz open-pit coal mines continue to introduce high-capacity wheel mining complexes, stripping excavators equipped with 16 cubic m capacity buckets, hauling units and other production equipment. The retooling of the coal pits and the use of rational mining methods has made it possible to raise the relative share of coal mined with wheel excavators from 85.9 percent to 93.5 percent. At present the Ekibastuzugol Association is using the open pit method to mine over one-fourth of the coal mined in USSR Minugleprom [Ministry of the Coal Industry].

As we can see, there is direct evidence of positive gains. However, despite the enterprises' meeting their plan targets, many important problems still remain unsolved.

Considerable worsening of the most important economic indicators--labor productivity, mining production costs and the capital-output ratio--has been allowed, hinting that production-intensification measures are inefficient.

Heading and stripping work has lagged constantly, and this has led to erratic underground and open-pit mining, and a worsening of technical and economic indicators.

The problems of constructing facilities for the social infrastructure's have been solved in poor fashion.

The scientific and production base needed to change over to mining coal by filling worked-out spaces was not provided on time.

In examining the above positions closely, it becomes apparent that there is nothing out of the ordinary about this situation: for a long time a number of factors have been at work in the sector, which have had a negative effect on the development of the republic's coal industry. Thus, in 1985, 14 Karagandaugol Association mines failed to meet their production quotas. The reasons? The lag in constructing new horizons, an inadequate supply of air

for ventilating the mine workings and developing the preparatory workings, a worsening of mining geological conditions and the poor technical level of working the mines.

Obsolete and worn out equipment is being replaced very slowly. Presently, over one-fourth of the value of our operating mining equipment comes from equipment which has depreciated by more than 75 percent.

The Ekibastuzugol Association's present method of mining coal with preliminary preparation of the coal massiv with drilling and blasting operations is causing complications when conveyers are set up at the mine face, and often causes the massiv to start burning. The payloaders are less than three-fourths as productive as the wheel excavators. In addition, their technical parameters keep them from working faces at their design height, which leads to more benches and transport horizons. What's more, the excavator park is aging (about 40 percent of them have been in operation for over 10 years), and they are being replaced slowly.

There are a great many unscheduled excavator shut-downs. This stems primarily from the constantly increasing depths of the workings, the complicated layouts of the transport lines with their dead ends, the lengthened hauling distances for the coal and overburden rocks and the inadequately mechanized level of the auxiliary operations, particularly rail transport. In the last 5 years alone, the depth of the workings has increased by 45 m and the transport distance from 10.5 to 15 km. There are already about 1,000 km of railroad lines overall. About 750 km of track are laid every year. The stripping shovels are inoperable for almost a fifth of the calendar working time.

All of these things have a negative effect on the excavator fleet's productivity, which is considerably lower than called for in the plan. It was no accident that stripping operations lagged behind by almost 30 million cubic m during the 11th Five-Year Plan period.

No proper solution has been found to the problem of keeping complex mining transport equipment in operating condition. However, up to now the Ekibastuzugol Association repair base (the mining transport equipment repair works, or RGTO, and the coal pits' mechanization and repair services administration) can handle R10.7 million in repair work per year, and it still falls short by more than half to meet the demands on it.

In compliance with directive resolutions, the RGTO works were to have been greatly expanded as long ago as 1985, but in three years USSR Minenergo [Ministry of Power and Electrification] managed to use a little over 3 percent of the estimated expansion allocations to this end. Now USSR Minugleprom's Ekibastuzshakhtstroy Combine has been ordered to expand the plant, but there is no evidence that the construction work is proceeding any faster.

Plans call for the volume of coal mined by the progressive open-pit method to be brought up to 70.9 percent by the end of the current five-year plan period.

The Ekibastuz Coal Basin, where plans call for the volume of coal mined using continuous and continuous-cyclical production methods to reach 93.2 million t

in 1990, bears most of this burden. The Vostochnyy Coal Pit is to be brought up to full capacity. It will be the first mine to make such wide-scale use of wheel excavators working in tandem with conveyer transport to mine bituminous coals, blend them, batch and weigh them precisely and ship them.

The Bogatyr and Severnyy open-pit mines will be reconstructed, retooled and will put additional capacities into operation. The use of progressive technical resolutions in coal-mining, stripping operations and in transport is contemplated, as is the use of the new ERP-1600 power shovel and the EKG-10 stripping shovels and 12 US's [not further identified], with their increased excavating parameters, and upgraded roller-bit drilling-rigs. The productivity of our mining excavators will be increased by 15.7 percent, that of overburden stripping shovels by 21.7 percent, and that of spreaders by 12.3 percent.

More coal is being mined in the Karaganda Coal Basin and should reach 51.2 million t per year. In order to meet the republic's needs for municipal and domestic fuel, plans call for the mining of 6.8 million t of coal per year for 5 years at the Shubarkolskiy Field, which is now being developed. A number of this basin's underground mines are to be renovated (which will increase their capacities), and additional capacities are to be put into operation at the Borlinskiy Coal Field.

At the underground mines, the primary tasks remain: improvement of the mining economy, the changeover to low-operation production methods, the continuation of comprehensively mechanized operation and automation of production processes. Labor productivity and production efficiency will continue to come about mainly through extensive introduction of technically improved mechanized complexes, which will raise the level of complexly-mechanized mining to 99.5 percent, and will increase the daily workload per mechanized complex to 920 t.

The creative collaboration of production workers and scientific employes should solve those important problems which greatly predetermine the continued development of underground coal mining, such as the introduction of the underground coal-mining practice of filling worked out shafts with rubble. Over a billion t of industrial grade coking coals are deposited in the Karaganda Basin under built-up areas. It has come to the point where if we delay any further, it will be too late to act. We need to implement a goal oriented integrated program for bringing the volume of coal mined this way up to 750,000 t per year by 1990.

In 1986 USSR Minugleprom charged the Karagandaugol Association, along with the Institute for Mining Affairs imeni Skochinskiy and the KNIUI [Kuznetsk Scientific-Research Coal Institute] with setting up a goal-oriented integrated program for mining our coal reserves by filling in worked-out spaces. A scientific and technical group has already been formed and has set about developing a procedure and testing equipment.

Soyuzuglemash [All-Union Association for Machinery and Spare Parts Manufacture of the Coal Industry] has, along with the above institutes, been charged with devising mining and gobbing complexes during the 12th Five-Year Plan period. The prompt implementation of these measures will be helpful, both in preserving areas in which the population lives in multistory housing, but also

in taking out substantial coal reserves, and will provide the Basin's largest underground mine--the imeni 50-letiya Oktyabrskoy revolyutsii--with 30 years of steady work, and will increase the annual output of the Aktaskaya underground mine by 800,000 t.

Along with putting new capacities into operation, the large in-house reserves of our operating enterprises need to be put to work. Thus, the value of the fixed industrial productive capital in the Karaganda Basin increased by 31 percent during the last five-year plan period, and the capital-output ratio was reduced by 10.7 percent.

Downtime of mechanized complexes caused by breakdowns amounts to about 25 percent per shift, and this causes losses of almost 2 million t of coal per year. Losses of work-time caused by unauthorized absences from work alone amounted to 128,000 man-hours during the 11th Five-Year Plan Period.

The breakdown rate for mining equipment is high. Time studies show that this causes mechanized complexes to stand idle up to a quarter of the time. This has cost the association 1.8 million t in mined coal, and 9,424 m in tunnel driving.

In recent years there has been an increase in the number of production personnel in the Karaganda Basin's underground mines. This has led to less coal being mined during the last five-year plan period, from 81.3 t per worker per month in 1980 to 71.1 t per month in 1985. A total of 188,000 man-hours of work-time have been lost.

Downtime for excavators on the stripping complex in the Ekibastuz Association came to about 18 percent of the time available, and this resulted in some 1.5 million cubic m of dead rock not being hauled to the dumps, and means that preparation of the mining horizons for mining operations is behind schedule.

There exists here yet another substantial reserve, the use of which would ensure the continuous operation of our mining equipment. We are referring to the repair base. It needs to be enlarged, since it is presently not meeting half the demand for repairs of machinery and equipment.

We can derive a solid economic effect from changing the coal-use structure, which has been directed towards municipal and domestic needs and to the population. These consumers are presently being supplied primarily with coal from Karaganda and Kuznetsk underground mines. After the Shubarkolskiy Field and then the Maykubenskiy Basin are developed, the needs of the immediate area can be met with local inexpensive coal. This will save the national economy about R7 per t of this coal, compared to the price for imported coal.

We will soon need to solve the problem of commercially briquetting the coals delivered to the population. This will reduce the huge amount of fuel lost in transit and during burning.

KaSSR Gosplan has submitted a proposal for the construction of a briquetting factory in the Shubarkolskiy Field, or the Priozernyy field located in the Turgay Lignite Field.

The intelligent use of industrial-grade coal, which can be achieved by substituting cheaper coal for this scarce fuel wherever possible, promises to provide the national economy with a substantial economic effect. This has been confirmed by tests conducted in ferroalloy production in a plant in Aktyubinsk, where in the process of smelting ferrochrome they replaced a third of the coke with Kuuchekinskiy Field coal mined by the open-pit method and having up to a 50 percent ash content. The qualitative output indicators got no worse and valuable fuel was saved as well. Moreover, there was no longer any need to use quartzite in this production process. The upshot was a saving of R1 million per year.

The time has come to transfer this experience to the republic's superphosphate plants and non-ferrous metallurgy enterprises as well. They are still using scarce and costly coke and coking coals even though pilot tests have shown that they can be replaced by coke made from high-ash Karaganda Basin underground coals.

Here's another way the economy can be accelerated. At present, the Karmetkombinat [Karaganda Metallurgical Combine] imports up to 2 million t of coal from the Kuznetsk Basin for use in producing metallurgical coke. But it has already been proven that it can be successfully replaced with Maykubenskiy Basin coals. The cost to produce the latter is much lower, as are the transport outlays. Overall, this saves the national economy no less than R10 million per year. This is doubtless, a cost-effective matter and could be resolved with the mutual motivation of both the fuel consumer and the supplier, i.e., Minchermet and Minugleprom. But these two reputable ministries have as yet been unable to agree in this affair.

Coal industry scientists are heavily in debt to the miners. They have been slow to find answers to the problems of mechanizing a number of different auxiliary operations such as deliveries of equipment and materials. This has resulted in the share of manual labor in both the underground and open cast mines remaining inordinately high.

A practical solution is still being awaited to the problem of working and mechanizing thin seams with soft wall rocks. There has been talk for years about the need to expand the mining practice of filling in worked-out spaces. This practice to a great extent predetermines all further growth in underground coal mining in the Karaganda Basin. We need to come to the point where solutions to these problems and the full-scale use of stripping operations in the Ekibastuz open-pit mines are made priority items during the 12th Five-Year Plan period. This is possible where there is initiative and where production workers and scientific employes are prepared to collaborate.

It is contemplated during the current five-year plan period that labor productivity calculated per single worker will increase by 9.2 percent. This is why coal-mining volumes have to be increased with no concomitant increase in the number of underground and open-pit miners.

A great deal of emphasis has been given to finding solutions to social problems, the first of which is the provision of workers' housing and social, cultural and domestic facilities.

There are specific factors which are hampering development in the Karaganda Basin. The most pressing problem is that of eliminating the aftereffects of underworking mines beneath built-up areas. The housing needed merely to relocate people from dwellings now being underworked and those already underworked amounts to some 600,000 square m. And counting the workers waiting for housing, the aggregate demand for housing in the Karagandaugol Association comes to 1,330,000 square m.

USSR Minugleprom has set the target: to build 1,070,000 square m of housing before 1990. This is the single instance where the housing demand for people moved out of underworked areas will be met.

The Karagandaugol Association also needs to take steps to make up for the lag in constructing other social and domestic and cultural facilities.

A number of protective measures also need to be taken; buildings and structures located in underworked areas need to be repaired and a great deal of land recultivation work still needs to be done.

In order for these problems to be solved, USSR Minugleprom construction workers will have to carry out some R200 million worth of SMR [construction and installation work] by 1990. A program for conducting mining operations in the areas being built up will have to be developed, as will the sequence and times for demolishing the underworked housing, social, cultural and domestic facilities and industrial buildings. In order for this program to be implemented, the Karagandaugol Association's newly formed Ugleremstroy Trust will have to increase the amount of its construction work to R18-20 million. Construction and installation work and goal-oriented capital investments will limit the contract work done by KaSSR Minstroy to 88,000 sq m.

In order to carry out the tasks laid out in the plans for the 12th Five-Year Plan and the future, the Karagandaugol Association needs to:

- develop a comprehensive plan for developing the Karaganda Basin;
- ensure that breakage face work fronts are reproduced promptly and that progressive operational coal-mining layouts are introduced;
- ensure increased mechanization of work and reduce manual labor by introducing dirtroads and monorails, packeted and containerized delivery materials and other small-scale mechanization items;
- take measures to speed up re-equipping of the mechanized complex park particularly of the complexes used to mine thin and medium-thick seams;
- improve the use of the Basin's existing scientific potential for the purpose of developing those large-scale comprehensive subjects dealing with the Basin's major problems.

Improving economic effectiveness in coal production means simultaneously solving our paramount social problem, i.e., continuing to make underground mining work easier and creating safer working conditions.

There is evidence within the Ekibastuz Basin of a serious disproportion in the growth of the productive capacities and in that of the social infrastructure. The situation was exacerbated during the 11th Five-Year Plan period, because the directive target was not met. Some 15,000 square m of housing, a 1,568-place school, a 200-place kindergarten, 1,176 sq m of store trade area, 10,000 square m of industrial and food goods storage facilities, a 10,000 number automatic telephone exchange and many other facilities were not put into operation or made available.

The 305,000 square m in housing construction, the preschool facilities for 1,940 children, schools for 4,024 children and the health-care facilities called for in the association's plan comprise a crucially important task.

Acceleration of coal industry growth is also dependent on further improvements in the economic mechanism.

Beginning in 1987, all this sector's associations (and enterprises) will be changed over to a new economic management system. The search has begun for effective ways to implement cost accounting on more levels and to change all the sector's associations and enterprises over to self-support.

It should be mentioned that the effective utilization of Kazakh coals in the national economy is directly dependent on expansion of the coking raw materials base, on improving the quality of steaming coals and reducing losses of fuel resources.

The goal-oriented integrated program "Rational Utilization of Raw Mineral Resources in the National Economy for 1986-1990 and for the Period up to 2000" particularly emphasizes the rational use of Ekibastuz Basin coal-mining wastes. The rocks accumulating in the dumps contain aluminum oxide, silicone and organic materials. Research has shown that it is technically possible to use them to obtain agloporite, aluminum carbide materials and alumina.

Plans for the current and upcoming five-year plan periods call for a pilot base to be set up for making multiple uses of overburden rocks, for construction of a plant to produce ceramic bricks from overburden rock and a shop for producing fire- and acid-proof porous concrete aggregate and the raw materials needed for smelting silico-aluminium alloys.

An enterprise is being built in the Karaganda Basin which will produce 50 million bricks per year from coal-enrichment wastes. Some of the Basin's underground mines are using methane--a highly calorific associated gas--as fuel for their boiler houses. About 1 million cubic m of waste rock will be used as roadbed fill for highways and railroad beds and for filling in cracks and above-ground surface sinks located over mine fields.

It has been decided to initiate development of our republic's third fuel base--the Turgay Lignite Basin--during this five-year plan period. These

local coals are causing interest with regard to their being processed into liquid fuel. The Kzyltalskiy Field, which includes the Orlov Section, from which commercial development is also to be launched, is one of the largest fields containing high-grade (by sulfur content and alkalinity) coals.

The following attests to the scope and prospects for the Turgay Basin: coal pits with a total output of 120 million t of coal per year can be constructed in just those few fields which have been thoroughly explored. The GRES's which will feed power to the North-West Kazakhstan and South Urals areas can be built on the basis of this rich natural storehouse of inexpensive fuel.

The Chelyabinskugol Association has constructed an exploratory-operational coal pit in the Priozernyy Field for the purpose of testing the mined coal in the power stations.

The part played by Kazakhstan in providing power stations and metallurgical enterprises--indeed, the republic's entire national economic complex--with bituminous coal fuel, will increase during the current five-year plan period and for the period up to the year 2000. The demand for coal in the housing and domestic sector is increasing as well.

The beginning of the five-year plan period looks promising for these coal miners, who mined 3.8 million t of above-plan coal in 1986. It is worth noting that almost half was mined by the underground miners of Karaganda. It has been a long time since high-rank coking coal has been mined underground at such high rates.

Increased output has been noted in the Ekibastuz Association, whose collective sent consumers 5.3 million t more coal than in 1985. They plan to mine as much as 93.2 million t of coal here by the end of this five-year plan period.

The Shubarkolskiy Field has begun operation. But rail consists hauling coal for domestic needs have been using a recently constructed spur line. Before the end of the year, this field will have to produce no less than a million t of coal, which at present must be shipped in from the Kuznetsk Basin. These shipments entail huge losses of coal and transport delays, and this is why we must force development of the work on the Shubarkolskiy deposits.

In order to meet industrial and civil needs and stop shipping coal out of Siberia, we need to work persistently, purposefully and systematically on developing, retooling and reconstructing the underground mines and coal pits; we also need to introduce progressive production methods, to use advanced experience and to mine more coal and spend less money in so doing.

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**BULGARIAN MODEL FOR INDIVIDUAL LABOR ACTIVITY EVALUATED**

Moscow IZVESTIYA in Russian 19 Feb 87 p 5

[Article by V.Zakharko, IZVESTIYA staff correspondent: "Secondary Salary: A Bulgarian Point of View."]

[Text] At his window Todor Khadzhikhristov looks as if he were on a TV screen, especially so because he looks so much like Yury Senkevich, the host of the TV "Travelers' Club" program. His window has a green plastic frame with large white letters on it: "Electronic Clocks and Watches Repaired: 5-7 p.m."

Hosting his TV program is for Senkevich a second job. In the same way repairing watches is not Todor's primary occupation. He works as an electrician in the town of Smolyan, Bulgaria. From 8 a.m. his job is to look after copiers, duplicating and other office machines at the Izotop-Servis Combine. When his shift ends he catches the first passing bus downtown, grabs a sandwich and adds a cup of extra-strong coffee, and at 5 p.m. sharp takes his place in a little corner in the hall of a city office. The place has been specially equipped for him with lockers, drawers, a table, and a customer's counter. That was where we met.

"Since those remote times," recollects Todor, "when electronic watches and clocks appeared here, first on the black market and then in government stores, it was impossible to have them repaired here, in Smolyan. The nearest repairshop is 100 kilometers from here, in Plovdiv, another is 150 kilometers further away, in Sofia."

On my own I add here: it was explained to me that the local authorities accepted the criticism directed at them but could not do anything to change the situation. Older watch repairers in regular shops did not dare to touch the fashionable electronic gadgets and it would have been unprofitable to employ an expert. There are not that many owners of electronic timepieces in the city with a population of 40 thousand, and they do not go out of order all that often. That means that a lot more money would have been spent on the expert's salary than recovered from his services. And the limited local budget has been stretched to its last lev and cannot subsidize such a service.

Having fallen behind this wonder of the 20th century--electronics, the consumer service in Smolyan for a long time did not know how to meet other needs of the

community. There was no chimney-sweep, though there is a chimney on almost every roof in the city, to say nothing of the villages. Hundreds of people build houses every year, but until recently you could not find through the government service a bricklayer, or a plasterer, or a carpenter. You could not have made to order a carved wood door- or window-frame of the kind that is traditional for Rodope architecture.

This district, situated in the Rodope at the height of 1500-2000 meters above sea-level, is considered rather backward in its social and economic development if compared with other regions of the country. And the consumer service was always its weakest point. Various transportation problems contributed to the situation. Numerous villages are "hanging" above mountain gorges, and icy or snow-covered roads in the fall or winter make even a doctor's visit a problem and who then even thinks of TV repairmen?

"As of late there have been changes for the better", I was told by the first deputy chairman of the ispolkom of the people's soviet Dimitr Andonov. "A number of big industrial enterprises were built in Smolyan and the region and the return from those started to make the local budget healthier. About 40 of those enterprises while engaged in manufacturing goods, also started to provide consumer services. They started with their own employees. The cable making factory also does certain car repairs; the tool making plant repairs household appliances; the wood-working factory sells scrap wood for building materials.

"The change became all the more noticeable", stressed Andonov, "after certain resolutions were passed. These resolutions lifted the previous ban on work for personal profit. A worker, an engineer, a white-collar worker, a student, a retired person, a housewife,--anybody now has the right to do contract work in his free time. The work can be contracted by plants, factories, trade organizations, food-and consumer service outlets. The initiative from below emerged in no time.

A certain student was one of the first: he was willing to do some chimney-sweeping. After him 12 carpenters and joiners at once decided to do some moonlighting. Bricklayers, plasterers, painters, glass-cutters, metal-workers, smiths, plumbers, they all applied for extra-job permits in mountain villages. Applications were also submitted to the ispolkom for permits to open "private businesses" by tailors, shoemakers, hairdressers and photographers. Handicraft industry came back to life. An estimated 1000 people have been added to those involved in manufacturing and service industries and this is quite a considerable force. In the fall of 1985 repairs of electronic watches and clocks ceased to be a problem."

"I have a wife and two little sons," says T. Khadzhikhristov, "My salary at the factory is 250 levs a month. My wife is a nurse, she earns about 200 levs (one lev equals one ruble--V.Z.). This does not seem so little but our expenses keep growing, even though we cannot afford everything in the stores. A kilo of meat costs over 5 levs, a kilo of butter costs the same, sausage may cost up to 16 levs a kilo. It becomes hard to maintain the house that we inherited from my father: the cost of electricity, water, and fuel has gone up. I don't

drive my car very often: a liter of gas costs 1 lev. I am 41 and in good health. I think it is my duty to provide more for my family now and for the future. That is why I was seeking additional income. I am an expert in electronics and can be of some use to the community."

Everybody in Bulgaria has the right to work in more than one place; but the permit to do so is usually granted only to those whose performance at their main job is considered satisfactory. Everybody at Izotop-Servis is satisfied with Todor's work. After he signed the contract with the city service center he was given use of this little shop. From time to time he goes to Plovdiv or Sofia to buy batteries and spare parts for which he pays his own money. As everybody else in private enterprise, he has to pay prices set by the government. He does his own simple accounting, he makes out receipts, enters in the book customers' names, prices, and dates of repairs, which is necessary for auditing.

"Unfortunately, there are not as many customers as I would want to have. Last year (he means 1986) there were about 160. My personal income was 460 levs. It is not all that much but still it considerably helped my family. Another 200 levs, that is 30 percent of total profit, I paid as tax. Though I think it is a bit too much," sighed Todor.

When we talked about this with first deputy chairman of the regional soviet Dimitr Andonov, he said: "The experience that we have acquired shows both positive and negative features of our laws on private enterprise. First, the positive side: it reduces shortages of goods and expands the range of services; it helps to get rid of everyday problems at a much faster rate, without undue headaches; it sets an example in efficiency and quality of work for the government customer service and thus makes it more flexible and responsive to the needs of the community. However, private enterprise could have developed even better, have been even more useful for everybody, if not for still existing artificial barriers and for the biased attitude toward "private business". This is the negative side.

For quite a while the manager of a radio and TV repair shop in Smolyan, Tsvetan Borisov did not know how to stop the flood of complaints from small mountain villages: the picture on their TV screens was unreliable. The sound was unsteady. The reason for all this was quite obvious: the aerial could not receive the signal from Sofia. They needed different aerials, better suited for local conditions. Whichever place Borisov addressed himself to, he got the standard answer: they didn't have the required aerials. A few days after the law on private enterprise was published Vasil Khebov came to see him. Khebov was a well-known talented metal-worker in Smolyan, now retired. He said that he could assemble as many aerials as needed if he were only given some premises and materials. They quickly rented an empty garage nearby, brought tubing and cables and connected electricity. One night Borisov was passing the garage on his way home from a relative's house. He saw light in the garage and looked in. He saw there dozens of aerials ready for delivery. Khebov was cutting parts for more. Thus this problem was resolved.

Borisov, who was young and full of energy, figured out right away the advantages of involving non-professionals in the consumer service. In faraway parts of the region he found technicians and engineers who knew about radio- and TV-sets. He

signed contracts with them and supplied them with spare parts. In other words, he did a lot to exploit all the advantages of private enterprise. However, many other administrators failed to display similar resourcefulness. These were the people whom Andonov meant when he complained that very often an initiative that emerged from "below" met with passive indifference "on top." Organizational work lags behind vital interests in creating necessary conditions for people who want to do some work in their leisure time. Premises, equipment and materials are allotted to them with delays and unwillingly. It is difficult to overcome the cautiously distrustful attitude of certain administrators toward these people: they are considered a sort of "wheeler-dealer".

"Yes," admits Andonov, "some of them are cheating and violating financial regulations, but these are very few. And you cannot judge everyone by their example. You cannot use this nitpicking to discourage honest people in their wish to work for their own and others' profit. We have to argue a lot and try to prove that there is nothing wrong with extra income if it has been earned honestly. No builder, car mechanic, tailor, or hairdresser will become a capitalist, whatever money he makes by working during his leisure time. None of them can undermine the socialist principles of the state. The purely bureaucratic approach of financial organizations seems to me equally erroneous, contradicting the correct decisions of the government. These organizations demand 30% of the additional income in tax, therefore bringing in income levelling which we have been fighting everywhere. Is it fair to impose equal taxes on the 1000 levs that a village smith earns in fire and smoke and on 25,000 levs of the joiner who is mass-producing window panes?"

Other participants in our talk agreed with this train of thought. It also became evident that lately private enterprise had become less active--due to organizational problems, bureaucracy, a still well-preserved tendency to ban everything, and especially due to financial shortfalls.

Though negative, this is still an experience which helps us to learn today. It helps us to see what we have to do next: aim at more flexibility and consistency in this important task," concluded D. Andonov.

As for the "forerunner and monopolist" in electronic watch repairs, Todor Khadzhikhristov, he told us when we were leaving: "I hope there will be more customers. Until now I was just waiting for them by my counter. Now I see that I have to start looking for them somehow, bring them in; maybe, by advertising."

As I managed to find out, customer service in Smolyan never had such an idea before.

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## CORRESPONDENTS REPORT LATE SHIFT INCONVENIENCES

Moscow TRUD in Russian 3 Apr 87 pp 1-2

[Article by TRUD correspondents: "Around the Night Shift"; first paragraph is TRUD introduction]

[Text] The decree of the CPSU Central Committee, the USSR Council of Ministers, and the AUCCTU [All-Union Central Committee of Trade Unions] entitled "On Converting Associations, Enterprises, and Organizations in Industry, as well as in Other Sectors of the National Economy to a Multi-Shift Operational Schedule for the Purpose of Increasing Production Efficiency" has set important and responsible tasks for the ministries, departments, party, soviet, and trade-union organs. How these tasks are being carried out is narrated below by our TRUD correspondents.

Our staff correspondent Yu. Kazakov reports that the first enterprises in Saratov to switch over to the two-shift operational schedule were those of this city's Leninskiy Rayon. Here they declined to grow "in breadth," having decided instead to develop production in the same areas.

"The main thing in making the switchover to the two-shift schedule is to organize the operation of passenger transport, trade, and children's institutions," considers V. Shuvakin, a turner at the Elmash Plant and a delegate to the 27th CPSU Congress. "With regard to our plant, in my opinion, everything dependent on us has already been done here."

After their shift is finished, the workers are driven home by the plant bus. During the night shift the cafeteria and snack-bar are open, and items may even be purchased to take home. There are no problems with taking care of children: at one of the plant's children's preschool institutions a group has been organized where a child can be left for an entire week while you work on the second shift.

With the conversion to the two-shift schedule, the plant has begun to renew its equipment more actively. Moreover, the old machine tools are being transferred to kolkhozes and sovkhozes of the sponsored Turkovskiy Rayon. Possibilities have begun to manifest themselves for a more intensive mobilization of the latest equipment, and areas in the workshops have been

freed up. Such areas in Shop 19, for example, are being slated for a rest area or a reading room.

Since 15 November of last year this enterprise has freed up and sold more than 100 units of equipment and more than 120 persons are now working on the second shift.

The city services are likewise restructuring their work. In order to carry persons home who have finished work on the second shift, since 1 January of the present year, an additional 88 streetcars and 56 trolley-buses have begun to make runs. Many enterprises have concluded agreements with the streetcar and trolley-bus administration for providing transport by a strictly specific time. Furthermore, the gorispolkom has assigned one of the departments of the Saratov Polytechnical Institute the task of working out a scheme for "staggering" the shifts at the city's enterprises so as to more rationally utilize the urban transport system and to avoid "peak" situations during the morning and afternoon hours.

Unfortunately, a number of places have approached the solution of these problems in a pro forma manner. They have hastened to draw up fine-sounding demands but have not been in any hurry to take effective measures.

The questions put by V. Konstantinov, TRUD's correspondent in Smolensk did not catch the leading officials of the electro-medical apparatus plant by surprise. Here there were, neatly printed out and enumerated measures with regard to switching a significant portion of the workers to the two-shift schedule. Not a single commission has had any fault to find. While last year only 56 persons were working on the two-shift schedule, by the end of the present year, according to these documents, some 300 of this plant's workers will already be on the evening shift. By this means it is intended to free up 40 units of obsolete equipment equipment and 280 square meters of production areas. Questions of feeding people, providing them with medical services, and taking them home at midnight have also been thought out.

But all this is still on paper.

The entire electroplating shop, upon learning of the correspondent's visit, gathered around the desk of the senior foreman. "Write down," said electroplater Ye. Cheminova, as she approached, "that the cafeteria on the second shift is operating very badly. Here's the selection: either dried vermicelli or sauerkraut. So what can you do except have some tea and a roll and go to work on a hungry stomach."

"We have to wait about 40 minutes for a streetcar," electroplater V. Zhernakov put in, "so as to leave the plant. Many persons just can't stand waiting, so they set off on foot. And this, mind you, is at night, after working an entire shift."

These and other replies by the workers were commented upon by A. Rudenko, the plant's deputy chief engineer.

"Indeed," he agreed, "many of our proposals have not been carried out. We've complained to the Sixth Cafeteria Trust about the poor work of the cooks, but so far there's been no reaction. As for the shop medical service, we don't have enough specialists for working on the second shift. Nor has the problem of the children's institutions been solved yet. Our request for transferring Nursery No 67 to this plant has gotten lost in the departmental run-around...."

So it turns out that the "departments," the cafeteria trust, and the staff roster are to blame for the indecipherable organization of multi-shift work.... But what about the administration itself and the plant's trade-union committee? A. Starostin, the deputy chief of the Sverdlovsk Streetcar and Trolley-Bus Board, informed me of the following:

"Back at the end of last year we sent out about 50 questionnaires to the city's enterprises. We requested them to set forth their suggestions with regard to improving the organization of transport operations, and in accordance with their replies, we were thinking of adjusting the traffic schedule of the streetcars and trolley-buses. But so far we've gotten back only 17 filled-out questionnaires. And among those who have not replied is the electro-medical apparatus plant."

Yes, indeed, neither declarations nor a director's orders are sufficient in and by themselves to carry out such a switchover. What is required is, essentially, a change in the life rhythm not only of the collective at a particular enterprise but of an entire city and its economy. The administration here has led to results directly contradictory to those anticipated.

Our Voronezh social correspondents Yu. Abramrnko and V. Zhuravlev have familiarized themselves with how multi-shift work has been organized at the Production Association imeni M.I. Kalinin and the Voronezh Machine-Building Plant imeni V.I. Lenin. Here is what they reported.

According to the testimony of N. Karyanov, OTK [Division of Technical Control] Buro Manager at Workshop No 14 of the Production Association imeni M.I. Kalinin, hardly a single part received for assembly from the thermoplastic automatic unit section corresponds to the required parameters. The principal cause of the poor quality of these plastic items is the faulty adjustment of the equipment. Here is just one example: out of 12 thermoplastic automatic units which the section has, 3-5 are not in operation on a daily basis.

"It's impossible to stop even one automatic unit for a complete overhaul: the plan has been 'overloaded'," says A. Shchetinin, the chief of Workshop No 14. "What are we doing to find a way out of the situation that has been created? We've organized work on a third shift."

No matter how sad it may seem, it is precisely the third shift which is increasing the number of non-operating thermoplastic automatic units. It is quite simple to explain the reason for this: the third shift is regarded as a kind of "deadweight" in this shop. The pressers work without a foreman, nor

are there any fitters or electricians. And, inasmuch as there is no hope of operating a machine tool if it breaks down, at the very beginning of the shift they switch on all the automatic units, and after one machine tool stops, they simply switch to another one. It sometimes happens that after such a "shock-type" night shift, all the thermoplastic automatic units are out of operation, and the persons arriving in the morning stay there without working, while they wait for the repair people to put the equipment back into order.

There is more harm than benefit from such a modus operandi. Moreover, during the half-year of the third shift's existence its workers have not once received the additional pay which they should have. It is completely natural, therefore, that there is no one in the brigade who wants to work so late at night, and the shop administration literally has to compel people to switch over to the third shift. It even has to have recourse to the threat of firing those who are obstinate.

During the high point of the night shift half of the machine tools of the third workshop of the Voronezh Machine-Building Plant imeni V.I. Lenin have not been in operation. Among such "willy-nilly parasites" were also the two highly productive and expensive "C-500" machining centers. And this despite the fact that in January and in February the plant under-fulfilled the plan by hundreds of thousands of rupees.

"We don't have enough machine-tool operators," explains V. Akinin, the deputy chief of the Third Shop.

In the Fourth Machine Shop out of six machine tools that evening, four with ChPU [numerical program control] were idle: people had also let this section. Because the work on such highly productive equipment had been very badly organized. And it is not only this which frightens people away from the night shift.

"Are there any incentives for employees to work at night?" we asked V. Pribytkov, the deputy chief of the plant's Work and Wages Division.

"Of course there are," Pribytkov replied. "Here, look for yourself," he added, holding out the "Provisional Regulations on Material Incentives for Machine-Tool Workers at the Plant imeni V.I. Lenin," as approved on 1 December 1986.

Indeed on paper everything looked to be in good order. Judging by this document, machine-tool operators working at night receive a bonus amounting to 25 percent of the piece-rate wage. But, in fact, the workers have never seen this money. And so, does that mean that the "Provisional Regulations" serve merely to throw dust in the eyes of those who try?

Let's sum up a few results. As we have seen from the report received from Saratov, the conversion of enterprises to a multi-shift operating schedule requires considerable efforts with regard to creating normal conditions of work and everyday life for those who switch over to the night shift. Here too they cannot get by without coordinating the actions of the enterprises and the municipal services. The task of the management and the trade-union committees

of the enterprises consists of thoroughly analyzing their own requirements for transport, children's institutions, the existing possibilities for taking children not just during the daytime, and in organizing the food service. The concern of the ispolkoms of the local Soviets is to satisfy all the needs arising in connection with the switchover to the new operating schedule.

Yes, the life rhythm of the entire urban organization is changed. From now on the "pulse" and "respiration" of the nighttime city must be just as smooth and precise as it is during the daytime hours. It is not a simple matter to achieve this. But all the more unacceptable here are the devices of the "command" economy. Merely changing the written schedule will yield nothing. We must create the maximum favorable conditions for those working with a multi-shift system. Of course, it is much more difficult to operate in such a way. But the harder it is, the more we have to work to obtain more workers. The resolution is unambiguous on this score, providing for an additional payment amounting to 40 percent of the hourly wage rate (salary) for each hour of work on the night shift. So the instances of "economizing" on additional payments about which V. Zhuravlev reports may be related to examples of harmful bureaucratic, self-serving activity.

All this is certainly not a matter of trifles. The fulfillment of the adopted solutions directly depends on them.

2384

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## GLADKIY ON PREPARATION FOR INDIVIDUAL LABOR LAW

Moscow TRUD in Russian 28 Apr 87 p 2

[Interview with Chairman of USSR State Committee on Labor and Social Problems I.I. Gladkiy by TASS Commentator Vladimir Petrunya: "Prestige of the Honest Ruble"]

[Text] On May 1 the USSR Individual Labor Law takes effect. The new business offers much promise, but it is also encountering some difficulties. This is the subject of the discussion between Chairman of USSR State Committee on Labor and Social Problems I.I. Gladkiy and TASS Commentator Vladimir Petrunya.

[Journalist] The period of preparation before the law takes effect has come to an end. It has been a long, complex, and, why hide painful period. The prospects of the popular initiative in this area should by now be clear. Realistically, what hopes can the state place on solving, with the help of these useful activities, the problem of satisfying demand for goods and services?

[Chairman] You are right, the period of preparation before the law takes effect has indeed been complex. True, many steps toward the law's implementation have already been taken: all the necessary normative and explanatory documents have been approved and local soviet ispolkoms have become involved. However, I can not say that the preliminary work is finished. The problem is that a certain change in the attitude of the people, including officials responsible for the law's implementation, is in order, and this takes longer. Therefore, it seems premature now to talk about a mass popular initiative. Rather, we should say that such an initiative is still only awakening.

Local soviets should start a broad propaganda and management campaign to get people involved in individual labor, taking into consideration regional differences. There is a need to increase material and technical assistance to those engaged in such labor, and to help them distribute their products. A system must be developed to inform them about demand for particular goods and services, about the accepted order and place where they can be sold, etc.

The work to explain the law's intent to the public is also very important. Sometimes a person engaged in individual labor is called a petty proprietor. This is wrong, since such activities are based entirely on labor of the

person involved. Also, it is counterproductive, since it creates a negative attitude toward such labor. It should be clearly understood that individual labor is permitted by the state as a socially useful activity. It helps to fill the Soviet people's demand for goods and services and allows them to use their leisure profitably.

Also, I would like to note that local authorities should act more boldly, not to wait for directives, memoranda, normative orders, or planned quotas from above. Regional authorities have been given broad prerogatives to encourage individual labor, and they must use them fully. At present, however, many rayon, city, and oblast soviet ispolkoms have been laying in wait and have remained passive.

Now to answer your question whether the hope is justified that the implementation of the law will solve the problem of satisfying the people's demand for goods and services. Our country's shortcomings in satisfying the people's demand for goods and services are well-known, and to eliminate them in an optimal way in the shortest possible time period is a very important goal for economic managers at all levels. This is the main thrust of the Complex Program to improve production of consumer goods and services for the 1986-2000 period.

The solution of the problem should not be wholly dependent on the USSR Individual Labor Law. It can, however, be of great assistance in finding the solution, since it will significantly widen the range of services available to the public, improve the quality of services, and respond more flexibly to changes in demand. And even though the law is yet to take effect, it has already started to work in this direction. These are good examples of it. Lately, there has been growth in such activities as transportation services provided by private car owners, repairs of apartments, cars, and appliances, etc.

It has been happening in many cities, helping solve the problems of the service sector. All this gives one hope that once the law comes into effect, it will impact positively on the way the public is supplied with a whole range of important goods and will improve services for the Soviet people.

[Journalist] Indeed, the prestige of the honestly earned ruble increasingly assets itself as an integral part of the social environment. It is even being acknowledged in the West. Britain's Daily Telegraph wrote in an editorial that the new law "has planted the seeds of significant changes in the Soviet economy." But here is the problem: powerful individual initiative will of necessity come into conflict with the lumbering, ossified public service sector. The latter, it appears, has nothing to be pleased about: now it either has to move faster or to face bankruptcy. These are not my fears, but the arguments advanced by the silent opponents of the restructuring process. Perhaps we should be frank: is a dose of healthy competition in this sector good for the society?

[Chairman] I would like to remind you that public production has been and will remain the basic means of fulfilling the constantly growing needs of the Soviet people for goods and services. Therefore, there can be no mention of bankruptcy of the public sector stemming from the implementation of the USSR

Individual Labor Law. Since individual labor will develop as a secondary activity, this sector presents no serious danger to the state-owned and cooperative enterprises and organizations.

Moreover, it should be kept in mind that individual labor will be channeled into those services which the state does not provide--for instance, into care for the sick and the elderly--or where demand considerably exceeds supply--service and repair of privately owned motor vehicles, construction work on private garden and summer house plots, apartment repairs, etc.

Thus, it is too early to raise the question of competition, even if some managers in the service sector are expressing concern. Not only is there nothing to worry about but, on the contrary, growth of individual labor will spur services companies to make improvements, especially in work quality and more convenient working hours. Should this be feared? First of all, in any case it is the consumer, or you and I, who benefits. Second, such competition will bring about improvements in goods and services production of state and cooperative enterprises. It is important to keep in mind that the state, as stipulated in the USSR Constitution, will still regulate individual labor, making sure that it serves the society's best interests.

[Journalist] The bottleneck on the path of the new law is, as has practice has shown, the bureaucratic cobweb on conventional thinking. And of conventional actions. It is better, many say, to stall, to show caution, to express unfounded fears rather than take upon oneself the added trouble of supervising individual labor.

[Chairman] The bureaucratic stalling machinery is a real force which is able, as we have had a number of occasions to find out, to bring to nothing any useful initiative. And even though we are dealing here with no mere initiative but a state law, such concerns are legitimate. On the other hand, the bureaucrat will find himself in a difficult position this time around. He will be squeezed between the activity of the masses from below and the active support for this activity from above. Such a vice is difficult to withstand. In a word, restructuring and acceleration of the socio-economic development of the country create all the conditions for the USSR Individual Labor Law to be effective.

[Journalist] The new law invites retirees to resume work activity. But existing rules place certain restrictions on retirees' labor.

[Chairman] According to the new rule passed by the USSR Council of Ministers last April, income from individual labor will not affect pension payments. There will no longer be any restrictions on retirees' participation in individual labor. Potentially, it is one of the largest segments of the population--there are seven million retirees in the country--that will be in an excellent position to engage in individual labor.

[Journalist] And another practical question. Many are interested in the rate of taxation. There should be, in theory, a flexible system...

[Chairman] I agree that taxes are important. The tax system should stimulate people's interest in individual labor and simultaneously limit superprofits. The old system, especially as far as it was applied to the artistic and cultural sector, provided for rather heavy taxation, so that a considerable share of personal income was withheld as income tax.

Currently, considerable changes have been introduced into the tax law. There is no need to discuss every detail here; it would suffice to say that in almost all types of individual labor incomes below 3,000 rubles per year (or, on average, 250 rubles per month) will be taxed at the same rate as wages and salaries in the public sector, i.e., up to 13 percent. Incomes up to 840 rubles per year (or, on average, 70 rubles a month) will not be taxed. A gradual progressive rate will be applied to incomes in excess of 3,000 rubles per year, while some activities will be taxed at preferential rates.

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## LABOR MANAGEMENT REFORMS IN ESTONIA ADVOCATED

Moscow PRAVDA in Russian 4 May 87 p 2

[Article by V. Konstantinov, chairman of the Estonian SSR State Committee for Labor, and Yu. Sillaste, director of the Scientific Research Institute on Labor, Estonian Branch, candidate of labor: "Is the Department on Cost Accounting?"; first two paragraphs are PRAVDA introduction]

[Text] A "roundtable" discussion was held with the leading officials of Estonia's production associations, which are operating on the principle of the "three S's--self-support [samookupaemost], self-financing, and self-administration]. The following direct question was put to them:

"What relations would you like to have with this republic's State Committee for Labor?"

And a no less direct reply was received. V. Tarasov, deputy general director for economics of a radio-electronic equipment association and candidate of economic sciences, declared the following:

"In its present form--none at all! Just like the other monitoring departments, you have tormented us with innumerable checkups, petty fault-finding, and unjustified interference in our internal management activity. We would like relations that are different in principle with the labor organs at both the republic and the local levels. Cost accounting relations! If, let's say, our specialists have carried out a certain development, then, from your part, we need some state expertise; an intelligent consultation is necessary. But it should be on a fee-paying basis! We have already been convinced on more than one occasion that free-gratis consultations more often than not prove to be irresponsible and yield too few results. And we would like you also to be fully responsible for the success or failure of the new development!"

These words, which touch the "nerve" of the times, reflected the principal essence of the changes accomplished and those anticipated in our economic management system. Their strategy was outlined at the January (1987) Plenum of the CPSU Central Committee as follows: "Taking present-day requirements into account, we must accelerate the restructuring of the framework, as well as the operating style, forms, and methods of the planning, financial, and

other general-economic organs, of all ministries and departments. We must also define their functions and tasks more precisely."

The new management conditions, the wage reform, the policy course aimed at expanding democratic principles, along with the other life-giving processes which are being developed in our economy, insistently require us to abandon the excessively petty overseeing of departments, auditing principles, and dictating matters with regard to the lower-level units; we must instead learn how to become necessary partners to the basic unit of the national economy--the enterprises.

The current style, methods, and habitual practice of ministries and departments with regard to interfering in the operational activities of plants, factories, and associations cannot provoke anything but irritation and dissatisfaction among the lower-level collectives nowadays. They expect relations of genuine partnership. Moreover, this problem did not arise in just an hour. It had already been pinpointed in the course of a widespread economic experiment. As is known, the latter presupposed a reduction of directive-type indicators, a transition to working in accordance with stable norms, and other measures directed at expanding the rights of enterprises.

But, in reality, many of these plans have remained merely good intentions. As was the case before, the directors complain about an abundance of all manner of indicators and assignments. To be sure, these are now designated as "estimated," but they come down "from above," just as they used to previously. Moreover, the demand for them is just the same as it was for the directive types. But, you know, it seemed as if the estimated indicators were conceived as being formed "from below upward," so as to be utilized in planning and other economic estimates. For example, in order to determine the volume and structure of resources to be allocated to an enterprise. It turns out that the problem does not lie in how to designate this or that indicator, but rather by whom and how it is to be determined and for what purposes it is to be utilized.

It is getting to the point where the management units are attempting to "plug in" even advanced experience just like an insert into the already-set organism of an enterprise. "Protect us from a stream of innovations 'from above.' Like fireworks, they flare up and die out, and then we have to disentangle the consequences..." such is the complaint of the association specialists. Yet at the same time, they are precisely the ones who have originated the idea of having the departments develop work on introducing advanced experience on a contractual basis.

At times there is simply no limit to departmental zeal. Let's say that, in accordance with the conditions of the wage reform, the enterprises were accorded the right to determine for themselves the structure and roster of their own administrative apparatus. At the same time, based on the example of the republic's agro-industrial complex, it turned out that its divisions and administrative boards were giving instructions, just as they had previously, to enterprises regarding what positions to introduce, which ones could not be cut back, etc. In their turn, the RAPO's [Rayon Agro-Industrial Associations]

also require that their own organizations coordinate their staff rosters with them.

But just how should we make sure that the departments finally abandon excessive regulation of everything and do everything to help them effect the transition to economic management methods? Let's try to examine this, based on the example of the Estonian SSR State Committee for Labor. Let's begin with the fact that the presently existing statute on the committee is already more than 10 years old. As everybody knows, the economic climate at that time was different, but since that time, if changes have been introduced into the statute, they have been predominantly of a cosmetic nature. Strictly speaking, the republic's State Committee for Labor even now, when new management conditions have come about, is obliged to operate in accordance with an obsolete document.

The statute states that the labor organs are responsible for labor productivity, for guaranteeing optimal employment, the broad-based introduction of new management principles and methods at enterprises, for bringing them to the lower levels of production, as well as for mobilizing the organizational-economic and social reserves for increasing production efficiency, and a great many other things. In short, it is easier to talk about what the State Committee for Labor is not responsible for.

And the trouble is not so much in the extremely wide range of responsibility as it is in the indefiniteness of this responsibility, in its "eroded" quality. For example, an analysis recently produced by scholars of the Scientific Research Institute has shown that, of the 30 most important functions of the republic's Committee for Labor, 25 must be carried out in conjunction with other economic departments. We probably do not need to explain that the word "conjunction" opens up a loophole for a lack of responsibility....

All this with definite and necessary obviousness now requires a determined restructuring of the work of the organs concerned with labor. It is also obvious that we must proceed on the basis that the labor resources which the state must administer in the future are territorial resources. It is specifically on the territory--whether it be in a city or a rayon--that we must solve the problems of distributing and redistributing the able-bodied population, as well as selecting the optimal forms and methods of its employment. And it is in the localities that the preliminary guidance of schoolchildren also takes place. Furthermore, as the principle of the "three S's" becomes more and more widespread, the burden on the local organs of authority will increase. In this connection, the demand of economic managers to be relieved of the concerns regarding the job placement of persons "freed up" as a result of deepening technical progress will not seem unjustified.

The justification for such an approach is affirmed by the wage reform, which is being carried out beginning this year in Estonia based on the territorial model. During the course of its progress the following has become clear: the role of the labor organs in the localities must be changed, while their responsibility must be increased. And the first steps along these lines have already been undertaken. The republic's government has adopted a decision to

create an automated "Job Placement" system. Since the beginning of this year all of Estonia's cities and rayons have introduced an integrated procedure for keeping track of and operating a job placement service for unemployed persons specifically through the local labor organs. However, this matter is still having difficulty making headway.

The Estonian SSR State Committee for Labor has formed a firm conviction concerning the urgency of transforming the job placement buros into rayon and city centers or services--the exact term used makes no essential difference--of employment and social care for the population; such units would take upon themselves the burden of the new tasks. In our opinion, all their activities should be constructed on a serious, cost-accounting basis in accordance with contracts with partners. By the way, such a center will be created in the very near future in the Kokhtla-Yarve region.

Such centers should also, obviously, have the competence and the authority to include an organization for retraining employees who have been "freed up." Payment for labor resources must be the source of financing this work. And, under the conditions of enterprises being on full cost accounting, such a posing of the question is in complete conformity with principle.

We think that a system of labor organs likewise needs new structural changes which would not be limited by methodological directives of a recommendational nature but would literally make themselves necessary to an enterprise on cost accounting.

By the way, such an approach has already cleared a path for itself in economic life. Within the system of the Estonian SSR Ministry of Light Industry a consulting firm entitled "Minor-Consultant" has been established with rights granted by the Statute on Small Enterprises. The first consulting-introductory organizations on cooperative principles have also been set up. A few days ago the Tallin Gorispolkom registered the following cooperatives: Integral, which offers services with regard to the use of computer equipment, and ELKO, which offers service to those persons in search of secondary employment.

Logic prompts us to say that the system of the State Committee for Labor ought to guide, coordinate, and channel the activity of the consulting services. It makes sense here to organize a small group of highly paid specialist-experts, who would guide the rayon, city, or zonal consulting-introductory subdivisions, as well as conducting finishing work, "coordinating" the assignments of the directive organs, along with the study and refinement of ideas prompted by life itself.

At the same time, the labor organs are obliged, as was also the case before, to ensure state policy in the field of labor and wages, to keep track of the implementation of the decisions of the leading "floors" in the area of social problems. In short, the monitoring-control functions must be retained by them, but they too must be constructed on new principles.

And the most important thing is as follows. While proceeding from the proposed innovations, it is necessary to form a Ministry of Labor in place of

the Committee for Labor. But this should not be simply a changes of signboards--such a reorganization should bear within itself the burden of cost accounting and payments for labor resources. What are we proposing in a practical sense? To set up a permanent wage fund for the five-year plan so as not to be tormented by the annual fever of reducing staffs. Within the limits of this fund we must accord the right to maintain a flexible number, without any consideration to the correlations between junior, senior, and leading specialists. An increase in a specialist's wages must be directly tied in with the quality of developments and the implementation of targeted tasks on a cost-accounting and contractual basis.

As regards the upgrading of skills and the retraining of the freed-up workers, and such a mass freeing up is probably inevitable in the course of scientific and technical progress, this must be prepared for well ahead of time. It seems to us that from the wage fund for the republic's national economy we must set aside a special portion for upgrading workers' skills.

Perhaps our proposals are disputable. But, in any case, the proposed model for solving problems in the field of labor administration deserves further study.

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## ACADEMY OF SCIENCES OFFICIAL ON NEED FOR LABOR SAFETY

Moscow PRAVDA in Russian 29 May 87 p 2

[Article by A. Sarkisov, corresponding member of the USSR Academy of Sciences: "Technology Without Danger"]

[Text] Major accidents and catastrophes that have occurred in recent years, accompanied by big losses in materials and human life, have undoubtedly focused attention on the problem of safety throughout the world. Objectively, however, this problem has emerged as one of the most crucial not as a result of the incidents that have taken place but as an unavoidable and inevitable consequence of the world scientific and technical revolution.

Such modern industrial facilities as large-scale water development projects and high-capacity power-generating complexes, chief among them nuclear power plants, chemical combines, and industrial combines for the conversion of nuclear fuel, and space rocket technology represent high potential danger. A key factor in the increased danger is the growth in density of transport communications lines on land, sea and in the air; other factors are the tendencies of modern technology to increase the voltage of equipment, as well as temperatures, pressures and speeds, and the extensive use of new materials, including flammable synthetic materials which, as a result of fire, release toxic substances.

In order to resolve these safety problems the time has come to systematically approach them in a comprehensive way, so that the human factor, together with technical measures, is taken into consideration. M. S. Gorbachev, underscoring this very principle in a television address on the occasion of the accident at the Chernobyl AES, said that as the scientific and technical revolution develops further, problems of discipline, of procedure and organization become of paramount importance.

It is necessary to think about the security of systems as early as when they are designed. Especially stringent requirements should be made with respect to construction and installation work, choice of materials and precision of manufacture, repair work, and care in the repair and renovation of equipment. It is necessary also to maintain control over equipment at all stages of operation.

As borne out by experience elsewhere in the world, installations that are subject to particular dangers in the event of accident are best protected in pressure-sealed casings. Such protective casings are broadly used in nuclear power plants. These are installations made entirely of reinforced concrete or of metal, designed to resist pressures projected as arising in worst-case accidents for the retention and capture of radioactive products. Upon installation of an AES reactor in the USSR, equipment within the initial shell, which in case of accident would constitute a primary source for the spread of radioactivity, is also placed in sealed containers equipped with systems for reducing the pressure of steam.

Bearing in mind the high unit capacity of AES facilities of the future, we should accept the necessity in designing new plants of making thorough and objective comparative studies of comparable foreign as well as domestic experience.

Choosing the site of the installation is of basic importance in dealing with the safety problem. Its distance from major population points should ensure safety under worst-case conditions as they might arise either from internal causes or as a result of external influences, such as fires, earthquakes, and explosions in neighboring enterprises.

Increased safety means additional expense. The cost of these facilities is increasing, as is to be expected. Absolute safety, obviously, is unattainable in principle both from the standpoint of human behavior and in the context of modern industrial production. As intolerable as it is to plan in advance even for the lowest degree of vulnerability at an enterprise, however, it is just as intolerable to plan for even the lowest probability of failures or the chain of events that such an accident might entail. In all cases the attempt must be made to guaranty safety at the highest possible level, and in no case at a level dictated by dubious "economic" considerations.

The most effective means, and in many cases the only means, of researching the dynamics of accidents and of devising secure safety systems is by mathematical modeling. A realistically attained level of safety at a facility depends to a large extent on the quality of the mathematical modeling and the adequacy of physical processes as described. Despite definite achievements in modeling complex safety systems, the task of describing emergency procedures in mathematical terms still cannot be considered fully resolved. Further research in this field is therefore urgently needed.

Under conditions where the mathematical description is insufficiently reliable, and the task under investigation is of primary importance, it is justified in the interests of ensuring safety to undertake large-scale experiments, including the destruction of on-site installations being tested.

Analysis and generalization of operational testing plays a vital role inasmuch as the lack of relevant information could lead to a repetition of mistakes that have already been made. In this connection a detailed record and study

of all equipment malfunctions that occur, together with a systematic and broad exchange of information not only between enterprises within a single branch but between related branches, acquire particular importance.

Arising from the very nature of present-day technology is the need to increase the responsibility of researchers, designers, and engineers for the study, design and development of new installations and for assuring a high degree of safety in them. At the same time, by taking into consideration the experience that has been accumulated and the emergence of new techniques, it is obviously expedient to further develop protection systems in installations erected earlier and already in operation.

The critical safety factors for people engaged in work are irreproachable conditions of discipline as well as high professional qualifications of operating personnel, particularly of the control section--the engineering and technical personnel. In our judgment the preparation of engineers in VUZ's for operational assignments should now be carried out through special curriculums and programs clearly oriented to the practical activities facing them upon graduation. Preparing operational staff officers with the same plans and programs used with design, research and development engineers is completely unjustified. Unfortunately, this is the situation that has come about in a number of specialties having a bearing on future directions of technical progress.

In addition to rigorous practical proficiency acquired within the walls of the VUZ, engineering staff personnel need sound theoretical preparation without which the informed and deliberate operation of complex, highly automated industrial complexes of today is unthinkable. This theoretical grounding, however, is not quite the same as that which underlies the training, for example, of engineering designers. The theoretical training of students preparing for operational assignments with respect to the fundamental principles of science should, in our view, be aimed at study in depth of those aspects which in their totality may be called the physical principles of operation.

The operational aspect has long been developed not only in the lecture courses but also in laboratory work and practical exercises, in degree research work as well as course work, and through the development of academic source materials. The level of preparation of engineering staff officers depends to a large extent on the quality of the professional literature. In this respect matters are not at their best.

Electronic simulator-trainers are becoming the most effective means of practical training. Such trainers are equipped with panels that have controlling devices and normal measuring instruments, and they can duplicate through digital or analog simulation actual physical processes.

The value of electronic trainers lies in the fact that they not only make possible practice under operating conditions but also teach how to act in the event of all possible kinds of breakdowns, which may be reproduced either by the person running the trainer or programmed in such a way as to take the operator by surprise. The trainers are equipped with the means to record operational parameters, thereby making it possible to analyze in depth the processes involved and to evaluate the correctness of the operator's actions.

Many years of experience gained in using simulators in a number of fields of engineering confirm the high degree of effectiveness they have in the training of both operators of vehicles and stationary equipment. Side by side with the planning and development of potentially hazardous industrial projects, it would be wise to devise and develop for them suitable simulator-trainers.

In making a comprehensive study of duties involved there is a need to make selections, professionally and psychologically, by tests worked out on the basis of simulated operator activity, above all, under a variety of extreme situations.

Only a comprehensive approach to the resolution of technical problems and to human factors in developing and operating complex systems, together with the strengthening of discipline and production procedure by every means, will make it possible to improve substantially the reliability of engineering and to reduce to a minimum losses borne by the state because of operational failure.

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